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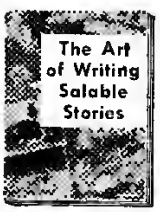

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EDITORIAL

THE FALLACY OF NULL-A

Some months back I made some remarks about Aristotelian logic vs. null-A, or multi-valued logic. I got some remarks in return, I hasten to add. From thinking about the discussions, and trying to get some conclusions from them, I have reached a viewpoint that I think may make sense. Try it on for size!

An insurance company, in working up its tables, considers a population. Now a *population* doesn't die—individuals do. For the insurance company's data-gathering function, then, multi-valued logic works.

But when the insurance company sets a rate—then it is necessarily, irrevocably and inescapably Aristotelian; either it *does* or it *does not*, change its rates. There is absolutely no possible conceivable situation intermediate between those two states *at the action level.*

That is, the responsible executive may consider changing them; he may have a tendency to change them. He may fear changing them, want to, dislike to, anticipate changing, regret changing, vacillate about it, or have any of some millions of different attitudes toward the action. He can have a wait-and-see policy, and delay—but that is a decision to not-change when it reaches the action level.

At the action level, Aristotelian logic and only Aristotelian logic can exist. Wherefore all thinking must, in the end, reduce to yes-no thinking. That's an inescapable situation, it seems to me. The decision to delay is simply the decision to not-do-now—which is a decision to not-do at the action level.

The action level acts like a squared term; it's always positive. A negative decision is an action; a decision not to act is itself an action. Therefore willy-nilly, like it or not, no matter what training the individual has, he's going to wind up with an Aristotelian conclusion of yes-or-no at the action level.

Trends and tendencies and per-

(*Continued on page 170*)

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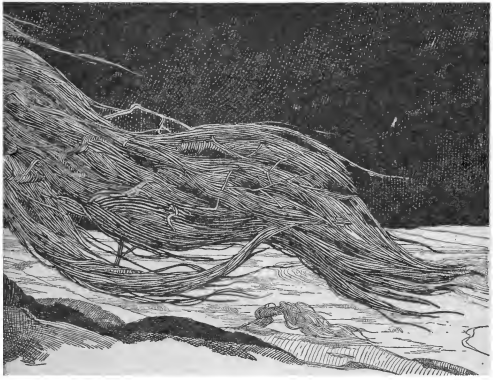


I.

The wind came across the bay like something living. It tore the already wildly turbulent surface so thoroughly to shreds that it was hard to tell where liquid ended and atmosphere began; it tried to raise waves that would have swamped the *Bree* like a chip, and blew them into impalpable spray before they had risen a foot.

The spray alone reached Barlennan, crouched high on the *Bree's* poop raft. His ship had long since been hauled safely ashore. That had been done the moment he had been sure that he would stay here for the winter; but he could not help feeling a little uneasy even so. Those waves were monsters. They were many times as high as any he had faced at sea, and somehow it was not completely reassuring to reflect that the lack of weight which permitted them to rise so high would also prevent their doing real damage if they did roll this far up the beach.

Barlennan was not particularly superstitious, but this close to the Rim of the World there was really no telling what could and could not happen. Even his crew, an unimaginative lot by any reckoning, showed occasional signs of uneasiness. There was bad luck here, they muttered—whatever dwelt beyond the Rim and sent the fearful, snow-laden winter gales blasting thousands of miles into the World might resent being disturbed. At every accident the muttering broke out anew, and accidents were becoming frequent. The fact that anyone is apt to make a misstep when he weighs about two and a quarter pounds instead of the five hundred and fifty or so to which he has been used all his life seemed obvious to the commander; but apparently an education, or at least the habit of logical thought, was needed to appreciate that.

Even Dondragmer who should have known better—Barlennan's long body tensed and he almost roared an order

before he really took in what was going on two rafts away. The mate had picked this moment, apparently, to check the stays of one of the masts, and had taken advantage of near-weightlessness to rear almost his full length upward from the deck. It was still a fantastic sight to see him towering, balanced precariously on his six rearmost legs, though most of the *Bree's* crew had become fairly used to such tricks; but that was not what impressed Barlennan. At two pounds' weight, one held on to something or else was blown away by the first breeze; and no one could hold onto anything with six walking legs. When that gale struck—but already no order could be heard, even if the commander were to shriek his loudest. He had actually started to creep across the first buffer space separating him from the scene of action when he saw that the mate had fastened a set of lines to his harness and to the deck, and was almost as securely tied down as the mast he was working on.

Barlennan relaxed once more. He knew why Don had done it—it was a simple, material act of defiance to anything malignant that might be driving this particular storm, and he was deliberately impressing his attitude on the crew. Good fellow, thought Barlennan, and turned his attention once more to the bay, that should have been a quarter of a mile from his stern rafts.

At present it was at nothing like that distance, though no witness could have told precisely where the shore line now lay. A blinding whirl of white spray and nearly-white sand hid everything more than a hundred yards from the *Bree* in every direction; and now even the ship was growing difficult to see as hard-driven droplets of methane-ammonia mixture struck bulletlike and smeared themselves over his eye shells. At least the deck under his many feet was still rock-steady; light as it now was, the vessel did not seem prepared to blow away. It shouldn't, the commander thought grimly, as he recalled the scores of cables now holding to deep-struck anchors and to the low trees that dotted the beach. It shouldn't—but his would not be the first ship to disappear while venturing this near the Rim. Maybe his crew's suspicion of the Flyer had some justice. After all, that strange being *had* persuaded him to remain for the winter, and had somehow done it without promising any protection to the *Bree* or her crew. Still, if the Flyer wanted to destroy them, he—or it—could certainly do so more easily and certainly than by arguing them into this trick. If that huge structure he rode should get above the *Bree* even here where weight meant so little, there would be no more to be said. Barlennan turned his mind to other matters; he had in full measure the normal Mesklinite horror of letting himself get even temporarily

under anything really solid.

The crew had long since taken shelter under the deck flaps—even the mate ceased work as the storm actually struck. They were all present; Barlennan had counted the humps under the protecting fabric while he could still see the whole ship. There were no hunters out, for no sailor had needed the Flyer's warning that a storm was approaching. None of them had been more than five miles from the security of the ship for the last ten days, and five miles was no distance to travel in this weight.

They had plenty of supplies, of course; Barlennan was no fool himself, and did his best to employ none. Still, fresh food was nice. He wondered how long this particular storm would keep them penned in; that was something the signs did not tell, clearly as they heralded the approach of the disturbance. Perhaps the Flyer knew that. In any case, there was nothing further to be done about the ship; he might as well talk to the strange creature. Barlennan still felt a faint thrill of unbelief whenever he looked at the device the Flyer had given him, and never tired of assuring himself once more of its powers.

It lay, under a small shelter flap of its own, on the poop raft beside him. It was an apparently solid block three inches long and about half as high and wide. A transparent, slightly bulging spot in the otherwise black surface of one square end looked like an eye, and apparently functioned as one. The only other feature was a small, round hole in one of the long faces. The block was lying with this face upward, and the "eye" end projecting slightly from under the shelter flap. The flap itself opened downwind, of course, so that its fabric was now plastered tightly against the flat upper surface of the machine.

Barlennan worked an arm under the flap, groped around until he found the hole, and inserted his pincer. There was no moving part, such as a switch or button, inside, but that did not bother him—he had never encountered such devices any more than he had met thermal, photonic, or capacity-activated relays. He knew from experience that the fact of putting anything opaque into that hole was somehow made known to the Flyer, and he knew that there was no point whatever in his attempting to figure out how it was done. It would be, he sometimes reflected ruefully, something like teaching navigation to a ten-day-old child. The intelligence might be there—it was comforting to think so, anyway—but some years of background experience were lacking.

"Charles Lackland here." The machine spoke abruptly, cutting the train of thought. "That you, Barl?"

"This is Barlennan, Charles." The commander spoke the Flyer's language, in which he was gradually becoming proficient.

"Good to hear from you. Were we right about this little breeze?"

"It came at the time you predicted. Just a moment . . . yes, there is snow with it. I had not noticed. I see no dust as yet, however."

"It will come. That volcano must have fed ten cubic miles of it into the air, and it's been spreading for days."

Barlennan made no direct reply to this. The volcano in question was still a point of contention between them, since it was located in a part of Mesklin which, according to Barlennan's geographical background, did not exist.

"What I really wondered about, Charles, was how long this blow was going to last. I understand your people can see it from above, and should know how big it is."

"Are you in trouble already? The winter's just starting—you have thousands of days before you can get out of here."

"I realize that. We have plenty of food, as far as quantity goes. However, we'd like something fresh occasionally, and it would be nice to know in advance when we can send out a hunting party or two."

"I see. I'm afraid it will take some rather careful timing. I was not here last winter, but I understand that during that season the storms in this area are practically continuous. Have you ever been actually to the equator before?"

"To the what?"

"To the . . . I guess it's what you mean when you talk of the Rim. That makes sense, at least."

"No, I have never been this close, and don't see how anyone could get much closer. It seems to me that if we went much farther out to sea we'd lose every last bit of our weight and go flying off into nowhere."

"If it's any comfort to you, you are wrong. If you kept going, your weight would start up again. You are on the equator right now—the place where weight is least. That is why I am here. I begin to see why you don't want to believe there is land very much farther north. I thought it might be language trouble when we talked of it before, but I begin to get a different idea. Perhaps you have time enough to describe to me now your ideas concerning the shape and nature of the world? Or perhaps you have maps?"

"We have a Bowl here on the poop raft, of course. I'm afraid you wouldn't be able to see it now, since the sun has just set and Esstes doesn't give light enough to help through these storm clouds. When the sun rises I'll show it to you. My flat maps wouldn't be much good, since none of them covers enough territory to give a really good picture."

"Good enough. While we're waiting for sunrise could you give me some sort of verbal idea, though? I must admit I'm curious."

"I'm not sure I know your language well enough yet, but I'll try.

"I was taught in school that Mesklin is a big, hollow bowl. The part where most people live is near the bottom, where there is decent weight. The philosophers have an idea that weight is caused by the pull of a big, flat plate that Mesklin is sitting on; the farther out we go toward the Rim, the less we weigh, since we're farther from the plate. What the plate is sitting on no one knows; you hear a lot of queer beliefs on that subject from some of the less civilized races."

"I should think if your philosophers were right you'd be climbing uphill whenever you traveled away from the center, and all the oceans would run to the lowest point," interjected Lackland. "Have you ever asked one of your philosophers that?"

"When I was a youngster I saw a picture of the whole thing. The teacher's diagram showed a lot of lines coming up from the plate and bending in to meet right over the middle of Mesklin. They came through the bowl straight rather than slantwise because of the curve; and the teacher said weight operated along the lines instead of straight down toward the plate," returned the commander. "I didn't understand it fully, but it seemed to work. They said the theory was proved because the surveyed distances on maps agreed with what they ought to be according to the theory. That I *can* understand, and it seems a good point. If the shape weren't what they thought it was, the distances would certainly go haywire before you got very far from your standard point."

"Quite right. I see your philosophers are quite well into geometry. What I don't see is why they haven't realized that there are two shapes that would make the distances come out right. After all, can't you see that the surface of Mesklin curves *downward?* If your theory were true, the horizon —the point on the sea that is farthest from you and still visible—would seem to be above you. How about that?"

"Oh, it is. That's why even the most primitive tribes know the world is bowl-shaped. It's just out here near the Rim that it looks different. I expect it's something to do with the light. After all, the sun rises and sets here even in summer, and it wouldn't be surprising if things looked a little queer. Why, it even looks as though the . . . horizon, you called it? . . . was closer to north and south than it is east and west when you're out this way. You can see a ship much farther away to the east or west. It's the light."

"Hm-m-m. I find your point a little difficult to answer at the moment." Barlennan was not sufficiently familiar with the Flyer's speech to detect such a thing as a note of amusement in his voice. "I have never been on the surface far from the. er, Rim—and never can be, personally. I didn't realize that things looked as you describe, and I can't see why they should, at the moment. I hope to see it when you take

that radio-vision set on our little errand."

"I shall be delighted to hear your explanation of why our philosophers are wrong," Barlennan answered politely. "When you are prepared to give it, of course." Lackland did not know all the sarcasm-inflections of the commander's native tongue either, which was just as well, as some of them had crept into his English at that point. "In the meantime, I am still somewhat curious as to whether you might be able to tell me when there will be a break in this storm."

"It will take a few minutes to get a report from the station on Toorey. Suppose I call you back about sunrise. I can give you the weather forecast, and there'll be light enough for you to show me your Bowl. All right?"

"That will be excellent. I will wait."

Barlennan crouched where he was beside the radio while the storm shrieked on around him. The pellets of methane that splattered against his armored back failed to bother him—they hit a lot harder in the high latitudes. Occasionally he stirred to push away the fine drift of ammonia that kept accumulating on the raft, but even that was only a minor annoyance—at least, so far. Toward midwinter, in five or six thousand days, the stuff would be melting in full sunlight, and rather shortly thereafter would be freezing again. The main idea was to get the liquid away from the vessel or vice versa before the second freeze, or Barlennan's crew would be chipping a couple of hundred rafts clear of the beach. The *Bree* was no river boat, but a full-sized ocean-going ship.

The commander had little time to consider this point, which had been settled long since in any case. It took the Flyer only the promised few minutes to get the required information, and his voice sounded once more from the tiny speaker as the clouds over the bay lightened with the rising sun.

"I'm afraid I was right, Barl. There is no letup in sight. Practically the whole northern hemisphere—which doesn't mean a thing to you—is boiling off its ice cap, and you're getting the results. I don't know how thick the cap is, but I understand the storms in general last all winter. The fact that they come separately in the higher southern latitudes is because they get broken up into separate, very small cells by Coriolis deflection as they get away from the equator."

"By what?"

"By the same force that makes any projectile you throw swerve so noticeably to the left—at least, while I've never seen it under your conditions, it would practically have to on this planet."

"What is 'throw'?"

"My gosh, we haven't used that word, have we? Well, I've seen you jump . . . no, by gosh, I haven't either! . . . when you were up visiting at my shelter. Do you remember

that word?"

"No."

"Well, 'throw' is when you take some other object—pick it up—and push it hard away from you so that it travels some distance before striking the ground!"

"We don't do that up in reasonable countries. There are lots of things we can do here which are either impossible or very dangerous there. If I were to 'throw' something at home, it might very well land on someone—probably me."

"Come to think of it, that might be bad. Three G's here at the equator is bad enough, and Mack figured you must have nearly seven hundred at the poles. Still, if you could find something small enough so that your muscles could throw it, why couldn't you catch it again, or at least resist its impact?"

"I find the situation hard to picture, but I think I know the answer. There isn't time. If something is let go—thrown or not—it hits the ground before anything can be done about it. Picking up and carrying is one thing; crawling is one thing; throwing and jumping are entirely different matters."

"I see . . . I guess. We sort of took for granted that you'd have a reaction time commensurate with your gravity, but I can see that's just man-centered thinking. You'd have to have, in order to live as we do under those circumstances; but of course there's no real reason to suppose that you'd live as we do. I guess I get it."

"What I could understand of your talk sounded reasonable. It is certainly evident that we are different; we will probably never fully realize just how different. At least we are enough alike to talk together—and make what I hope will be a mutually profitable agreement."

"I am sure it will be. Incidentally, in furtherance of it you will have to give me an idea of the places you want to go, and I will have to point out on your maps the place where I want you to go. Could we look at that Bowl of yours now? There is light enough for this vision set."

"Certainly. The Bowl is set in the deck and cannot be moved; I will have to move the machine so that you can see it. Wait a moment."

Barlennan inched across the raft to a spot that was covered by a smaller flap, clinging to deck cleats as he went. He pulled back and stowed the flap, exposing a clear spot on the deck; then he returned, made four lines fast about the radio, secured them to strategically placed cleats, removed the radio's cover and began to work it across the deck. It weighed more than he did by quite a margin, though its linear dimensions were smaller, but he was taking no chances of having it blown away. The storm had not eased in the least, and the deck itself was quivering occasionally. With the eye end of the set almost to the Bowl, he propped the other end up at an angle with spars so

that the Flyer could look downward. Then he himself moved to the other side of the Bowl so that he could also be seen, and began his exposition.

Lackland had to admit that the map which the Bowl contained was logically constructed and, as far as it went, accurate. Its curvature matched that of the planet quite closely, as he had expected—the major error being that it was concave, in conformity with the natives' ideas about the shape of their world. It was about six inches across and roughly one and a quarter deep at the center. The whole map was protected by a transparent cover—probably of ice, Lackland guessed—set flush with the deck. This interfered somewhat with Barlennan's attempts to point out details, but could not have been removed without letting the Bowl fill with ammonia snow in moments. The stuff was piling up wherever it found shelter from the wind; in irregularities on the decks, in the spaces between the rafts which made up the *Bree*, and in the lee of the ship itself. The beach was staying relatively clear, but both Lackland and Barlennan could imagine what was happening on the other side of the hills that paralleled it on the south. The latter was secretly glad he was a sailor. Land travel in this region would not be fun for some thousands of days.

"I have tried to keep my charts up to date," he said as he settled down opposite the Flyer's proxy. "I haven't attempted to make any changes in the Bowl, though, because the new regions we mapped on the way up were not extensive enough to show. There is actually little I can show you in detail, but you wanted a general idea of where I planned to go when we could get out of here.

"Well, actually I don't care greatly. I can buy and sell anywhere, and at the moment I have little aboard but food. I won't have much of that by the time winter is over, either; so I had planned, since our talk, to cruise for a time around the low-weight areas and pick up plant products which can be obtained here—materials that are valued, sometimes very highly, by the people farther south because of their effect on the taste of food."

"Spices?"

"If that is the word for such products, yes. I have carried them before, and rather like them—you can get good profit from a single shipload, as with most commodities whose value depends less on their actual usefulness than on their rarity."

"Your people are more like mine than I would have believed," remarked Lackland. "I take it, then, that once you have loaded here, you don't particularly care where you go?"

"That is right. I understand that your errand will carry us close to the Center, which is fine—the farther south we go, the higher the prices I can get; and the extra length of the jour-

ney should not be much more dangerous, since you will be helping us as you agreed."

"Right. That is excellent—though I wish we had been able to find something we could give you in actual payment, so that you would not feel the need to take time in spice-gathering."

"Well, we have to eat. You say your bodies, and hence your foods, are made of very different substances from ours, so we can't use your foodstuffs. Frankly, I can't think of any desirable raw metal or similar material that I couldn't get far more easily in any quantity I wanted. My favorite idea is still that we get some of your machines, but you say that they would have to be built anew to function under our conditions. It seems that the agreement we reached is the best that is possible, under those circumstances."

"True enough. Even this radio was built specifically for this job, and you could not repair it . . . your people, unless I am greatly mistaken, don't have the tools. However, during the journey we can talk of this again; and perhaps the things we learn of each other will open up other and better possibilities."

"I am sure they will," Barlennan answered politely.

He did not, of course, mention the possibility that his own plans might succeed. The Flyer would hardly have approved.

II.

The Flyer's forecast was sound; some four hundred days passed before the storm let up noticeably. Five times during that period the Flyer spoke to Barlennan on the radio, always opening with a brief weather forecast and continuing a more general conversation for a day or two each time. Barlennan had noticed earlier, when he had been learning the strange creature's language and paying personal visits to its outpost in the "Hill" near the bay, that it seemed to have a strangely regular life cycle; he found he could count on finding the Flyer sleeping or eating at quite predictable times, which seemed to have a cycle of about eighty days.

Barlennan was no philosopher—he had at least his share of the common tendency to regard them as impractical dreamers—and he simply shrugged this fact off as something pertaining to a particularly weird but admittedly interesting creature. There was nothing in the Mesklinite background that would enable him to deduce the existence of a world that took some eighty times as long as his own to rotate on its axis. The very idea of the world's rotation was another bit of philosophy he had picked up in school—it was another theory put forth to explain why the oceans didn't all collect at the center of the Bowl—but Barlennan was not convinced. Mesklin was a pretty big place to be spinning like a

top, he felt, and the *Bree* had carried him over more of it than most philosophers had ever seen.

Lackland's fifth call was different from the others, and more welcome for several reasons. The difference was due partly to the fact that it was off schedule; its pleasant nature to the fact that at last there was a favorable weather forecast.

"Barl!" The Flyer did not bother with preliminaries—he knew that the Mesklinite was always within sound of the radio. "The station on Toorey called a few minutes ago. There is a relatively clear area moving toward us. He was not sure just what the winds would be, but he can see the ground through it, so visibility ought to be fair. If your hunters want to go out, I should say that they wouldn't be blown away, provided they wait until the clouds have been gone for twenty or thirty days. For a hundred days or so after that we should have very good weather indeed. They'll tell me in plenty of time to get your people back to the ship."

"But how will they get your warning? If I send this radio with them I won't be able to talk to you about our regular business, and if I don't I don't see—"

"I've been thinking of that," interrupted Lackland. "I think you'd better come up here as soon as the wind drops sufficiently. I can give you another set—perhaps it would be better if you had several. I gather that the journey you will be taking for us will be dangerous, and I know for myself it will be long enough. Thirty-odd thousand miles as the crow flies, and I can't yet guess how far by ship and overland."

Lackland's simile occasioned a delay; Barlennan wanted to know what a crow was, and also desired an explanation of flying. The first was the easier to get across. Flying for a living creature, under its own power, was harder for him to imagine than throwing—and the thought was more terrifying. He had regarded Lackland's proven ability to travel through the air as something so alien that it did not really strike home to *him;* but there was something weirder about the idea of a being that the man could describe casually as an *animal* having this mysterious power. Lackland saw this, partly.

"There's another point I want to take up with you," he said. "As soon as it's clear enough to land safely, they're bringing down a crawler. Maybe watching the rocket land will get you a little more used to the whole flying idea."

"Perhaps," Barlennan answered hesitantly. "I'm not sure I want to see your rocket land. I did once before, you know, and . . . well, I'd not want one of the crew to be there at the time."

"Why not? Do you think they'd be scared too much to be useful?"

"No." The Mesklinite answered

quite frankly. "I don't want one of them to see me as scared as I'm likely to be."

"You surprise me, commander." Lackland tried to give his words in a jocular tone, though he realized full well that his listener was unlikely to be able to interpret it so. "However, I understand your feelings, and I assure you that the rocket will not pass above you. If you will wait right next to the wall of my dome, I will direct its pilot by radio to make sure of that."

"But how close to overhead will it come?"

"A good distance sideways, I promise. That's for my own safety as well as your comfort. To land on this world, even here at the equator, it will be necessary for him to be using a pretty potent blast. I don't want it hitting my dome, I can assure you."

"All right. I will come. As you say, it would be nice to have more radios. What is this 'crawler' of which you speak?"

"It is a machine which will carry me about on land as your ship does at sea. It would be a little hard to describe to you, since most of the words which come to my mind for the purpose are ones which would be just as meaningless to you as the original. You will see in a few days, or in a few hours at most."

Barlennan let the new word pass without question, since the remark was clear enough anyway. "I will come, and will see," he agreed, and turned his attention back to his ship.

The Flyer's friends on Mesklin's inner moon—if they were really there, which Barlennan was willing enough to believe—had prophesied correctly. The commander, crouched on his poop, counted only ten sunrises before a lightening of the murk and lessening of the wind gave their usual warning of the approaching eye of the storm. From his own experience he was willing to believe, as the Flyer had said, that the calm period would last one or two hundred days.

With a whistle that would have torn Lackland's eardrums had he been able to hear such a high frequency the commander summoned the attention of his crew and began to issue orders.

"There will be two hunting parties made up at once. Dondragmer will head one, Merkoos the other; each will take nine men of his own choosing. I will remain on the ship to co-ordinate, for the Flyer is going to give us more of his talking machines. I will go to the Flyer's hill as soon as the sky is clear to get them; they, as well as other things he wants, are being brought down from above by his friends, therefore all crew members will remain near the ship until I return. Plan for departure thirty days after I leave—I should be back by then with the machines. Karondrasee, you will have a meal ready for all hands ten days before departure time, and one for me two days before I am

to leave. Set to work at once; the storm is dying, and I should be able to go in four or five days, though I will give you more precise information in a little while.

"Sir, is it wise for you to leave the ship so early? The wind will still be high." The mate was too good a friend for the question to be impertinent, though some commanders would have resented any such reflection on their judgment. Barlennan waved his pincers in a manner denoting a smile.

"You are quite right. However, I want to save the time, and the Flyer's Hill is only a mile away."

"But—"

"Furthermore it is downwind. We have many miles of line in the lockers; I will have two bent to my harness, and two of the men—Terblannen and Hars, I think, under your supervision, Don, will pay those lines out through the bitts as I go. I may—probably will—lose my footing, but if the wind were able to get such a grip on me as to break good sea cord, the *Bree* would be miles inland by now."

"But even losing your footing—suppose you were to be lifted into the air—" Dondragmer was still deeply troubled, and the thought he had uttered gave even his commander pause for an instant.

"Falling—yes—but remember that we are near the Edge—at it, the Flyer says, and I can believe him when I look north from the top of his hill. As some of you have found, a fall means nothing here."

"But you ordered that we should act as though we had normal weight, so that no habits might be formed that would be dangerous when we returned to a livable land."

"Quite true. This will be no habit, since in any reasonable place no wind could pick me up. Anyway, that is what we do. Let Terblannen and Hars check the lines—no, check them yourself. It will take long enough. It might be a good idea later to establish a permanent line between the ship and the hill, so we could go there even in a storm if we desired. However, that can be considered later.

"That is all for the present. The watch under shelter may rest. The watch on deck will check anchors and lashings."

Dondragmer, who had the latter watch, took the order as a dismissal and proceeded to carry it out in his usual efficient manner. He also set men to work cleaning snow from the spaces between rafts, having seen as clearly as his captain the possible consequences of a thaw followed by a freeze. Barlennan himself relaxed, wondering sadly just which ancestor was responsible for his habit of talking himself into situations that were both unpleasant to face and impossible to back out of gracefully.

For the rope idea was strictly spur-of-the-moment, and it took most of the several days before the clouds vanished for the arguments he had used on his mate to appeal to their inventor. He was not really happy even when he lowered himself onto the snow that had drifted against the lee rafts, cast a last look backward at his two most powerful crew members and the lines they were managing, and set off across the windswept beach.

Actually, however, it was not too bad. There was a slight upward force from the ropes, since the deck was several inches above ground level when he started; but the slope of the beach quickly remedied that. Also, the trees which were serving so nobly as mooring points for the *Bree* grew more

and more thickly as he went inland. They were low, flat growths with wide-spreading tentacular limbs and very short, thick trunks, generally similar to those of the lands he knew deep in the southern hemisphere of Mesklin. Here, however, their branches arched sometimes entirely clear of the ground, left relatively free by an effective gravity less than one two hundredth that of the polar regions. Eventually they grew close enough together to permit the branches to intertwine, a tangle of brown and black cables which furnished excellent hold. Barlennan found it possible, after a time, practically to climb toward the hill, getting a grip with his front pincers, releasing the hold of his rear ones and twisting his caterpillarlike body forward so that he progressed almost in inchworm fashion. The cables gave him some trouble, but since both they and the tree limbs were relatively smooth no serious fouling occurred.

The beach was fairly steep after the first two hundred yards; and at half the distance he expected to go, Barlennan was some six feet above the *Bree's* deck level. From this point the Flyer's hill could be seen, even by an individual whose eyes were as close to the ground as those of a Mesklinite; and the commander paused to take in the scene as he had many times before.

The remaining half mile was a white, brown, and black tangle, much like that he had just traversed. The vegetation was even denser, and had trapped a good deal more snow, so that there was little or no bare ground visible. Barlennan knew from his earlier trips that the soil was far richer and less sandy this far from the bay, which caused the seeming strangeness of more vegetation where there was less moisture.

Looming above the tangled plain was the Flyer's hill. The Mesklinite found it almost impossible to think of it as an artificial structure, partly because of its monstrous size and partly because a roof of any description other than a flap of fabric was completely foreign to his ideas of architecture. It was a glittering metal dome some twenty feet in height and forty in diameter, nearly a perfect hemisphere. It was dotted with large, transparent areas and had two cylindrical extensions containing doors. The Flyer had said that these doors were so constructed that one could pass through them without letting air get from one side to the other, though Barlennan had seen him do it only once. The portals were certainly big enough for the strange creature, gigantic as he was.

One of the lower windows, all of which were several feet above ground level, had an improvised ramp leading up to it which would permit a creature of Barlennan's size and build to crawl up to the pane and see inside. The commander had spent much time on that ramp while he was first learning to speak and understand the Flyer's

language; he had seen much of the strange apparatus and furniture which filled the structure, though he had no idea of the use to which most of it was put.

The Flyer himself appeared to be an amphibious creature—at least, he spent much of the time floating in a tank of liquid. This was reasonable enough, considering his size. Barlennan himself knew of no creature native to Mesklin larger than his own race which was not strictly an ocean or lake dweller—though he realized that as far as weight alone was considered, such things might exist in these vast, nearly unexplored regions near the Rim. He trusted that he would meet none, at least while he himself was ashore. Size meant weight, and a lifetime of conditioning prevented his completely ignoring weight as a menace.

There was nothing near the dome except the ever-present vegetation. Evidently the rocket had not yet arrived, and for a moment Barlennan toyed with the idea of waiting where he was until it did. Surely when it came it would descend on the farther side of the hill—the Flyer would see to that, if Barlennan himself had not arrived. Still, there was nothing to prevent the descending vessel from passing *over* his present position; Lackland could do nothing about that, since he would not know exactly where the Mesklinite was. Few Earthmen can locate a body fifteen inches long and two in diameter crawling horizontally through tangled vegetation at a distance of half a mile. No, he had better go right up to the dome, as the Flyer had advised. The commander resumed his progress, still dragging the ropes behind him.

He made it in good time, though delayed slightly by occasional periods of darkness. As a matter of fact it was night when he reached his goal, though the last part of his journey had been adequately illuminated by light from the windows ahead of him. However, by the time he had made his ropes fast to a stanchion of the ramp and crawled up to a comfortable station outside the window the sun had lifted above the horizon on his left. The clouds were almost completely gone now, though the wind was still strong, and he could have seen in through the window even had the inside lights been turned out.

Lackland was not in the room from which this window looked, and the Mesklinite pressed the tiny call button which had been mounted on the ramp. Immediately the Flyer's voice sounded from a speaker beside the button.

"Glad you're here, Barl. I've been having Mack hold up until you came. I'll start him down right away, and he should be here by next sunrise."

"Where is he now? On Toorey?"

"No; he's drifting at the inner edge of the ring, where circular velocity keeps you over just the same spot on

the equator—only six hundred miles up. He's been there since well before the storm ended, so don't worry about having kept him waiting yourself. While we're waiting for him, I'll bring out the other radios I promised."

"I thought they were being brought by the rocket, too."

"No, I had them. Mack has only the crawler and my week's bread and butter."

"Since I am alone, it might be well to bring only one radio this time. They are rather awkward things to carry, though light enough, of course."

"Maybe we should wait for the crawler before I bring them out at all. Then I can ride you back to your ship —the crawler is well enough insulated so that riding outside it wouldn't hurt you, I'm sure. How would that be?"

"It sounds excellent. Shall we have more language while we wait, or can you show me more pictures of the place you come from?"

"I have some pictures. It will take a few minutes to load the projector, so it should be dark enough when we're ready. Just a moment—I'll come to the lounge."

The speaker fell silent, and Barlennan kept his eyes on the door which he could see at one side of the room. In a few moments the Flyer appeared, walking upright as usual with the aid of the artificial limbs he called crutches. He approached the window, nodded his massive head at the tiny watcher, and turned to the movie projector, which he immediately began to load with a reel which he removed from a pocket of his strange garments. The screen at which the machine was pointed was on the wall directly facing the window; and Barlennan, keeping a couple of eyes on the human being's actions, squatted down more comfortably in a position from which he could watch it in comfort.

He waited silently while the sun arched lazily overhead. It was warm in the full sunlight, pleasantly so, though not warm enough to start a thaw; the perpetual wind from the northern ice cap prevented that. He was half dozing while Lackland finished threading the machine, stumped over to his relaxation tank and lowered himself into it. Barlennan had never noticed the elastic membrane over the surface of the liquid which kept the man's clothes dry; if he had, it might have modified his ideas about the amphibious nature of human beings.

From his floating position Lackland reached up to a small panel and snapped two switches. The room lights went out and the projector started to operate. The sun was still high, though now descending, but the window was large only in Barlennan's estimation and the room was quite dark enough for the picture to be seen distinctly. The commander had seen pictures of the Solar planets before, but naturally there was much he had not been shown; and he was sufficiently ab-

sorbed so that he noticed neither the setting nor the rising of the sun. It was a fifteen-minute reel, and had not quite finished when Lackland had to haul himself once more to his feet and crutches with the information that the rocket was landing.

"Do you want to watch Mack, or would you rather see the end of the reel?" he asked. "He'll probably be on the ground by the time it's done."

Barlennan tore his attention from the screen with some reluctance. "I'd rather watch the picture, but it would probably be better for me to get used to the sight of flying things," he said. "From which side will it come?"

"The east, I should expect. I have given Mack a careful description of the layout here, and he already had photographs; and I know an approach from that direction will be somewhat easier, as he is now set. I'm afraid the sun is interfering at the moment with your line of vision, but he's still about forty miles up—look well above the sun."

Barlennan followed these instructions and waited. For perhaps a minute he saw nothing; his eye was caught by a glint of metal some twenty degrees above the rising sun.

"Altitude ten—horizontal distance about the same," Lackland reported at the same moment. "I have him on the scope here."

The glint grew brighter, holding its direction almost perfectly—the rocket was on a nearly exact course toward the dome. In another minute it was close enough for details to be visible—or would have been, except that everything was now hidden in the glare of the rising sun. Mack hung poised for a moment a mile above the station and as far to the east; and as Belne moved out of line Barlennan could see the windows and exhaust ports in the cylindrical hull. The machine was being landed in a horizontal attitude, the keel rockets doing the work; as it came within half a mile of the ground the snow underneath began to swirl and lift in the jetwash. The exhaust itself was invisible, though in an oxygen atmosphere a blue combustion flame might have been detectable starting a few hundred yards from the nozzles. The storm wind had dropped almost completely, but now a warm breeze laden with a taint of melting ammonia began to blow from the point where the exhaust struck the ground.

The drops of semiliquid spattered on Barlennan's eye shells, but he continued to stare at the slowly settling mass of metal. Every muscle in his long body was at maximum tension, his arms held close to his sides, pincers clamped tightly enough to have shorn through steel wire, the hearts in each of his body segments pumping furiously. He would have been holding his breath had he possessed breathing apparatus at all similar to that of a human being. Intellectually he knew that the thing would not fall—he kept

telling himself that it could not; but having grown to maturity in an environment where a fall of six inches was usually fatally destructive even to the incredibly tough Mesklinite organism, his emotions were not easy to control. Subconsciously he kept expecting the metal shell to vanish from sight, to reappear on the ground below flattened out of recognizable shape. After all, it was still *hundreds of feet* up—

On the ground below the rocket, now swept clear of snow, the black vegetation abruptly burst into flame. The exhaust was cold, in the sense that random motion of its molecules was at a minimum; but it contained an enormous amount of kinetic energy, and where its tremendous velocity was checked the temperature was bound to rise. Black ash blew from the landing point, and the ground itself glowed briefly. For just an instant this lasted before the glittering cylinder settled lightly into the center of the bare patch. Seconds later the thunder which had mounted to a roar louder than Mesklin's hurricanes died abruptly, and the rocket was safely down. Almost painfully, Barlennan relaxed, opening and shutting his pincers to relieve the cramps.

"If you'll stand by a moment, I'll be out with the radios," Lackland said. The commander had not noticed his departure, but the Flyer was no longer in the room. "Mack will drive the crawler over here—you can watch it come while I'm getting into armor."

Actually Barlennan was able to watch only a portion of the drive. He saw the rocket's cargo lock swing open and the vehicle emerge; he got a sufficiently good look at the crawler to understand everything about it—he thought—except what made its caterpillar treads move. It was big, easily big enough to hold several of the Flyer's race unless too much of its interior was full of machinery. Like the dome, it had numerous and large windows; through one of these in the front the commander could see the armored figure of another Flyer, who was apparently controlling it. Whatever drove the machine did not make enough noise to be audible across the mile of space that still separated it from the dome.

It covered very little of that distance before the sun set, and details ceased to be visible. Esstes, the smaller sun, was still in the sky and brighter than the full moon of Earth, but Barlennan's eyes had their limitations. An intense beam of light projected from the crawler itself along its path, and consequently straight toward the dome, did not help either. Barlennan simply waited. After all, it was still too far for really good examination even by daylight, and would undoubtedly be at the hill by sunrise.

Even then he might have to wait, of course; the Flyers might object to the sort of examination he really wanted to give their machinery.

III.

The tank's arrival, Lackland's emergence from the dome's main air lock, and the rising of Belne all took place at substantially the same moment. The vehicle stopped only a couple of yards from the platform on which Barlennan was crouched. Its driver, clad in pressure armor substantially identical with that worn by Lackland, also emerged; and the two men stood and talked briefly beside the Mesklinite. The latter rather wondered that they did not return to the inside of the dome to lie down, since both were rather obviously laboring under Mesklin's gravity; but the newcomer refused Lackland's invitation.

"I'd like to be sociable," he said in answer to it, "but honestly, Charlie, would you stay on this ghastly mudball a moment longer than you had to?"

"Well, I could do pretty much the same work from Toorey, or from a ship in a free orbit for that matter," retorted Lackland. "I think personal contact means a good deal. I still want to find out more about Barlennan's people—it seems to me that we're hardly giving him as much as we expect to get, and it would be nice to find out if there were anything more we could do. Furthermore, he's in a rather dangerous situation himself, and having one of us here might make quite a difference—to both of us."

"I don't follow you."

"Barlennan is a tramp captain—a sort of free-lance explorer-trader. He's completely out of the normal areas inhabited and traveled through by his people. He is remaining here during the southern winter, when the evaporating north polar cap makes storms which have to be seen to be believed here in the equatorial regions—storms which are almost as much out of his experience as ours. If anything happens to him, stop and think of our chances of meeting another contact!

"Remember, he normally lives in a gravity field from two hundred to nearly seven hundred times as strong as Earth's. We certainly won't follow him home to meet his relatives! Furthermore, there probably aren't a hundred of his race who are not only in the same business but courageous enough to go so far from their natural homes in the face of such a mixture of genuine danger and superstition as they seem to be bucking. Of those hundred, what are our chances of meeting another? Granting that this ocean is the one they frequent most, this little arm of it, from which this bay is an offshoot, is six thousand miles long and a third as wide—with a very crooked shore line. As for spotting one, at sea or ashore, from above—well, Barlennan's *Bree* is about forty feet long and a third as wide, and is one of their biggest ocean-going ships. Scarcely any of it is more than three inches above the water, besides.

"No, Mack, our meeting Barlennan

was the wildest of coincidences; and I'm not counting on another. Staying under three gravities for five months or so, until the southern spring, will certainly be worth it. Of course, if you want to gamble our chances of recovering nearly two billion dollars worth of apparatus on the results of a search over a strip of planet a thousand miles wide and something over a hundred and fifty thousand long—"

"You've made your point," the other human being admitted, "but I'm still glad it's you and not me. Of course, maybe if I knew Barlennan better—" Both men turned to the tiny, caterpillarlike form crouched on the waist-high platform.

"Barl, I trust you will forgive my rudeness in not introducing Wade McLellan," Lackland said. "Wade, this is Barlennan, captain of the *Bree*, and a master shipman of his world—he has not told me that, but the fact that he is here is sufficient evidence."

"I am glad to meet you, Flyer McLellan," the Mesklinite responded. "No apology is necessary, and I assumed that your conversation was meant for my ears as well." He performed the standard pincer-opening gesture of greeting. "I had already appreciated the good fortune for both of us which our meeting represents, and only hope that I can fulfill my part of the bargain as well as I am sure you will yours. As for Charles' remaining here where he obviously suffers much discomfort, I can only say that, while we would like to have him with us, we would much rather see him again in the spring in good health. I have a good crew, and have no doubt that we shall winter in perfect safety."

"You speak English remarkably well," commented McLellan. "Have you really been learning it for less than six weeks?"

"I am not sure how long your 'week' is, but it is less than thirty-five hundred days since I met your friend," returned the commander. "I am a good linguist, of course—it is necessary in my business; and the films that Charles showed helped very much."

"It is rather lucky that your voice could make all the sounds of our language. We sometimes have trouble that way."

"That, or something like it, is why I learned your English rather than the other way around. Many of the sounds we use are much too shrill for your vocal cords, I understand." Barlennan carefully refrained from mentioning that much of his normal conversation was also too high-pitched for human ears. After all, Lackland might not have noticed it yet, and the most honest of traders thinks at least twice before revealing all his advantages. "I imagine that Charles has learned some of our language, nevertheless, by watching and listening to us through the radio now on the *Bree*."

"Very little," confessed Lackland. "You seem, from what little I have

seen, to have an extremely well-trained crew. A great deal of your regular activity is done without orders, and I can make nothing of the conversations you sometimes have with some of your men, which are not accompanied by any action."

"You mean when I am talking to Dondragmer or Merkoos? They are my first and second officers, and the ones I talk to most."

"I hope you will not feel insulted at this, but I am quite unable to tell one of your people from another. I simply am not familiar enough with your distinguishing characteristics. I assure you that that is a very common occurrence when natives of different worlds —and sometimes even members of slightly differing varieties of the same species on a single world—meet for the first time. I have noticed that not all of your people on the *Bree* wear identical harness, but I have been unable to decide whether that is due to a difference of personal taste or of duty requirements. I have never seen one of you without some kind of harness, either. If you were members of my own race that might be due to necessity, but might also be custom or even religion. I just don't know."

Barlennan almost laughed.

"In my case, it is even worse. I am not entirely sure whether I have seen you without artificial covering or not. I would say that it doesn't matter greatly, except for the satisfaction of one's personal curiosity. In our case, your first guess—that the harness is a matter of personal taste—is largely correct; but in these regions one must wear *something* in order to be able to attach oneself to the deck cleats. Otherwise my crew would have been blown most of the way around the Rim by this time."

"Clear enough. For your information, my covering as you see it inside the dome is artificial, and strictly a matter of custom.

"However, that is carrying us a long way from business—we've used up a lot of daylight as it is. Mack, I assume you want to get back to the rocket and out where weight means nothing and men are balloons. When you get there, be sure that the receiver-transmitters for each of these four sets are placed close enough together so that one will register on another. I don't suppose it's worth the trouble of tying them in electrically, but these folks are going to use them for a while as contact between separate parties, and the sets are on different frequencies. Barl, I've left the radios by the air lock. Apparently the sensible program would be for me to put you and the radios on top of the crawler, take Mack over to the rocket, and then drive you and the apparatus over to the *Bree*."

Lackland acted on this suggestion, so obviously the right course, before anyone could answer; and Barlennan almost went mad as a result.

The man's armored hand swept out

and *picked up* the tiny body of the Mesklinite. For one soul-shaking instant Barlennan felt and saw himself suspended long feet away from the ground; then he was deposited on the flat top of the tank. His pincers scraped desperately and vainly at the smooth metal to supplement the instinctive grips which his dozens of suckerlike feet had taken on the plates; his eyes glared in undiluted horror at the emptiness around the edge of the roof, only a few body lengths away in every direction. For long seconds—perhaps a full minute—he could not find his voice; and when he did speak, he could no longer be heard. He was too far away from the pickup on the platform for intelligible words to carry—he knew that from earlier experience; and even at this extremity of terror he remembered that the siren-like howl of agonized fear that he wanted to emit would have been heard with equal clarity by everyone on the *Bree*, since there was another radio there.

And the *Bree* would have had a new captain. Respect for his courage had been the only thing that had driven that crew into the storm-breeding regions of the Rim. If that went, he would have no crew and no ship—and, for all practical purpose, no life. A coward was not tolerated on any ocean-going ship in any capacity; and while his homeland was on this same continental mass, the idea of traversing forty thousand miles of coastline on foot was not to be considered. Even though little more than half of that might bring him to civilization of a sort, it would probably be the wrong sort—and in any case, he would be unlikely to get even a fraction of the distance.

These thoughts did not cross his conscious mind in detail, but the attitude produced by his knowledge of the facts effectually silenced him while Lackland picked up the radios and, with McLellan, entered the tank below the Mesklinite. The metal under him quivered slightly as the door was closed, and an instant later the vehicle started to move. As it did so, a peculiar thing happened to its nonhuman passenger.

The fear might have—perhaps should have—driven him mad. His situation can only be dimly approximated by comparing it with that of a human being hanging by one hand from a window ledge forty stories above a paved street. The human being is at least intellectually familiar with height, however sharp an emotional shock such a situation may prove. To Barlennan, *any elevation at all* was something to be avoided. That had long since become ingrained habit, and was given no more thought than a man gives to walking. Hard and tough as his body tissues were, they did not begin to have the qualities which would have let him live a human-type life anywhere near the poles of his home world. He suffered, therefore, an

indescribable emotional shock caused by the abrupt shattering of this bit of conditioning, as well as that caused by the normal and well founded fear of his situation.

And yet he did not go mad. At least, he did not go mad in the accepted sense; he continued to reason as well as ever, and none of his friends could have detected a change in his personality. For just a little while, perhaps, an Earthman more familiar with Mesklinites than Lackland had yet become might have suspected that the commander was a little drunk; but even that passed.

And the fear passed with it. Nearly six body lengths above the ground, he found himself crouched almost calmly. He was holding tightly, of course; he even remembered, later, reflecting how lucky it was that the wind had continued to drop, even though the smooth metal offered an unusually good grip for his sucker-feet. It was amazing, the viewpoint that could be enjoyed—yes, he enjoyed it—from such a position until sunset shut it off. Looking down on things really helped; you could get a remarkably complete picture of so much ground at once. It was like a map; and Barlennan had never before regarded a map as a picture of country seen from above. It was simply a graphic means of setting down surveying results so that they made sense when compared with each other.

An almost intoxicating sense of triumph filled him as the crawler approached the rocket and stopped. The Mesklinite waved his pincers almost gayly at the emerging McLellan visible in the reflected glare of the tank's lights, and was disproportionately pleased when the man waved back. The tank immediately turned to the left and headed for the beach where the *Bree* lay; Mack, remembering that Barlennan was unprotected, thoughtfully waited until it was nearly a mile away before lifting his own machine into the air. The sight of it, drifting slowly upward apparently without support, threatened for just an instant to revive the old fear; but Barlennan fought the sensation grimly down and deliberately watched the rocket until it faded from view in the light of the lowering sun.

Lackland had been watching too; but when the last glint of metal had disappeared, he lost no further time in driving the tank the short remaining distance to where the *Bree* lay. He stopped a hundred yards from the vessel, as he was gradually coming to appreciate the psychological effects of height on the natives of Mesklin and did not want the tank towering over the crew; but he was quite close enough for the shocked creatures on the decks to see their commander perched on the vehicle's roof. It would have been less disconcerting had Lackland approached bearing Barlennan's head on a pole.

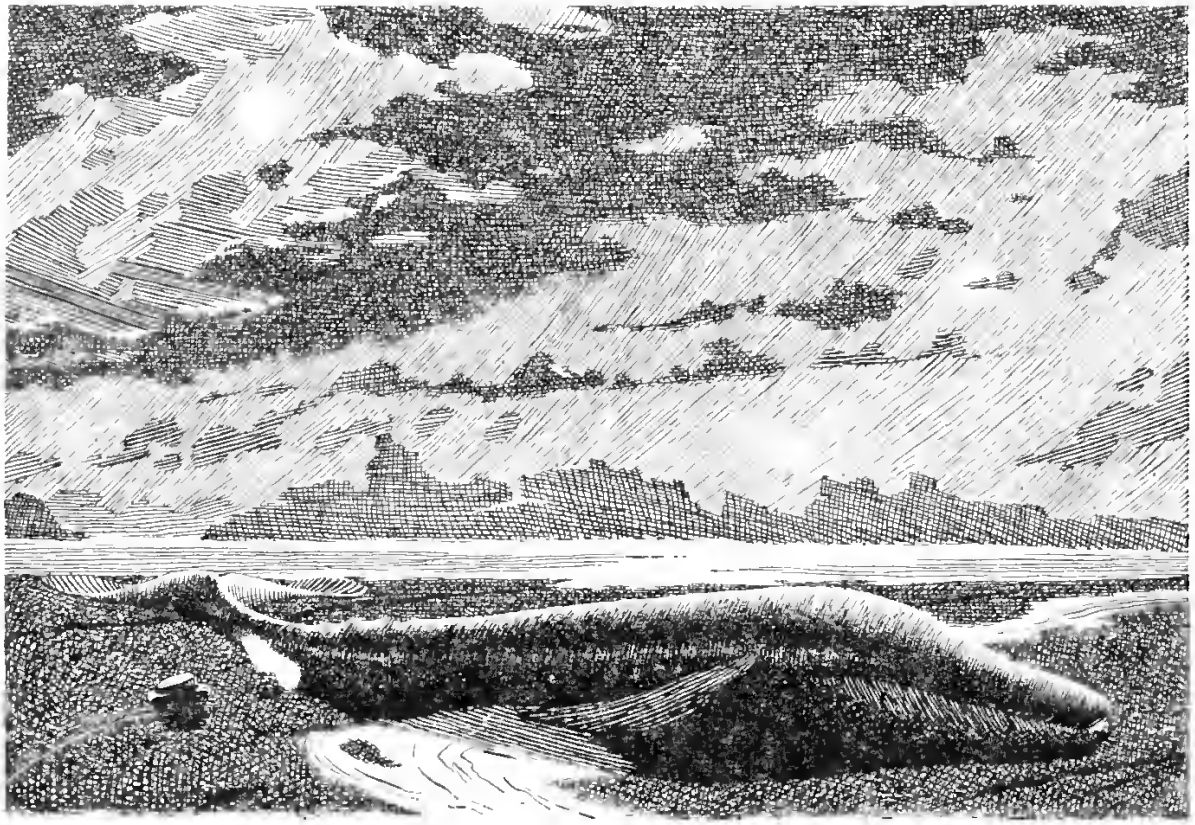
Even Dondragmer, the most intelligent and level-headed of the *Bree's* complement—not excepting his captain—was paralyzed for long moments; and his first motion was with eyes only, taking the form of a wistful glance toward the flame-dust tanks and "shakers" on the outer rafts. Fortunately for Barlennan, the crawler was not downwind; for the temperature was, as usual, below the melting point of the chlorine in the tanks. Had the wind permitted, the mate would have sent a cloud of fire about the vehicle without ever thinking that his captain might be alive.

A faint rumble of anger began to arise from the assembled crew as the door of the crawler opened and Lackland's armored figure emerged. They were impulsive, rough beings, that crew; their personalities, housed in different bodies, would have been perfectly at home in any waterfront of medieval Earth, though their intelligence would have averaged higher. Their half-trading, half-piratical way of life had left among them only those most willing to fight without hesitation at the slightest hint of menace to one of their number; the cowards had dropped away long since, and the individualists had died.

The only thing that saved Lackland's life as he emerged into their view was habit—the conditioning that prevented their making the hundred-yard leap that would have cost the weakest of them the barest flick of his body muscles. Crawling as they had done all their lives, they flowed from the rafts like a red-and-black waterfall and spread over the beach toward the alien machine. Lackland saw them coming, of course, but so completely misunderstood their motivation that he did not even hurry as he reached up to the crawler's roof, picked up Barlennan, and set him on the ground. Then he reached back into the vehicle and brought out the radios he had promised, setting them on the sand beside the commander; and by then it had dawned on the crew that their captain was alive and apparently unharmed.

The avalanche stopped in confusion, milling in undecided fashion midway between ship and tank; and a cacophony of voices ranging from deep bass to the highest notes the radio speaker could reproduce gabbled in Lackland's suit phones. Though he had, as Barlennan had intimated, done his best to attach meaning to some of the native conversation he had previously heard, the man understood not a single word from the crew. It was just as well for his peace of mind; he had long been aware that even armor able to withstand Mesklin's eight-atmosphere surface pressure would mean little or nothing to Mesklinite pincers.

Barlennan stopped the babble with a hoot that Lackland could probably have heard directly through the armor, if its reproduction by the radio had



not partially deafened him first. The commander knew perfectly well what was going on in the minds of his men, and had no desire to see frozen shreds of Lackland scattered over the beach. The human being was not only potentially very useful, but was also interesting company.

"Calm down!" Actually Barlennan felt a very human warmth at his crew's reaction to his apparent danger, but this was no time to encourage them. "Enough of you have played the fool here at no-weight so that all should know I was in no danger!"

"But you forbade—"

"We thought—"

"You were *high*—" A chorus of objections answered the captain, who cut them short.

"I know I forbade such actions, and I told you why. When we return to high-weight and decent living we must have no habits that might result in our thoughtlessly doing dangerous things like that—" he waved a pincer-tipped arm upward toward the tank's roof. "You know what proper weight can do; the Flyer doesn't. He put me up there, as you saw him take me down, without even thinking about it. He comes from a place where there is practically no weight at all; where, I believe, he could fall many times *his* body length without being hurt. You can see that for yourselves: if he felt

properly about high places, how could he *fly?*"

Most of Barlennan's listeners had dug their stumpy feet into the sand as though trying to get a better grip on it during this speech—a purely involuntary action, like the right foot pressure of a man in the right seat of a car. Whether they fully digested, or even fully believed, their commander's words may be doubted; but at least their minds were distracted completely from the action they had intended toward Lackland. A faint buzz of conversation arose once more among them, but its chief overtones seemed to be of amazement rather than anger. Dondragmer alone, a little apart from the others, was silent; and the captain realized that his mate would have to be given a much more careful and complete story of what had happened. Dondragmer's imagination was heavily backed by intelligence, and he must already be wondering about the effect on Barlennan's nerves of his recent experience. Well, that could be handled in good time; the crew presented a more immediate problem.

"Are the hunting parties ready?" Barlennan's question silenced the babble once more.

"We have not yet eaten," Merkoos replied a little uneasily, "but everything else—nets and weapons—is in readiness."

"Is the food ready?"

"Within a day, sir." Karondrasee turned back toward the ship without further orders. His captain had returned rather before schedule, but the cook did not want to be asked why the meal was not in readiness. Merely being right was not always excuse enough.

"Don, Merkoos. I assume your parties are set up as you have said. You will each take one of these *radios*. You have seen me use the one on the ship—all you have to do is talk anywhere near it. I will be able to hear you, and you will be able to hear each other. You can run a really efficient pincer movement with these, since you won't have to keep it small enough for both leaders to see each other.

"Don, I am not certain that I will direct from the ship, as I originally planned. I have discovered that one can see over remarkable distances from the top of the Flyer's traveling machine; and if he agrees I shall ride with him in the vicinity of your operations."

"But, sir!" Dondragmer was aghast. "Won't . . . won't that thing scare all the game within sight? You can hear it coming a hundred yards away, and see it for I don't know how far in the open. And besides—" he broke off, not quite sure how to state his main objection. Barlennan did it for him.

"Besides, no one could concentrate on hunting with me in sight so far off the ground—is that it?" The mate's pincers silently gestured agreement, and the movement was emulated by most of the waiting crew.

For a moment the commander was tempted to reason with them, but he realized in time the futility of such an attempt. He could not actually recapture the viewpoint he had shared with them until so recently, but he did realize that before that time he would not have listened to what he now considered "reason" either.

"All right, Don. I'll drop that idea—you're probably right. I'll be in radio touch with you, but will stay out of sight."

"But you'll be riding on that thing? Sir, what has happened to you? I know I can tell myself that a fall of a few feet really means little here at the Rim, but I could never bring myself to invite such a fall deliberately; and I don't see how anyone else could. I couldn't even picture myself up on top of that thing."

"You were most of a body length up a mast not too long ago, if I remember aright," returned Barlennan dryly, "or was it someone else I saw checking upper lashings without unshipping the stick?"

"That was different—I had one end on the deck," Dondragmer replied a trifle uncomfortably.

"Your head still had a long way to fall. I've seen others of you doing that sort of thing, too. If you remember, I had something to say about it when we first sailed into this region."

"Yes, sir, you did. Are those orders still in force, considering—" The mate paused again, but what he wanted to say was even plainer than before. Barlennan thought quickly and hard.

If he were to continue the prohibition on activities which might be dangerous under normal weight—things such as raising massive objects high enough for a person to get underneath, or reaching half a body's length past the outer rafts to check a cable—he would have a little trouble justifying indulgence in his own new-found amusement. He did not actually feel that he had no right to do what he forbade for others, of course—on the contrary; he was captain. Still, he had attempted to justify the order when it was first given; he had issued reasons for it, and if he disobeyed it now—well, even captains were supposed to be reasonable.

"We'll forget the order," he said slowly. "The reasons I gave for such things being dangerous are sound enough, but if any of you get in trouble for forgetting when we're back in high-weight it's your own fault. Use your own judgment on such matters from now on. Does anyone want to come with me now?"

Words and gestures combined in a chorus of emphatic negatives, with Dondragmer just a shade slower than the rest. Barlennan would have grinned had he possessed the physical equipment.

"Get ready for that hunt—I'll be listening to you," he dismissed his audience. They streamed obediently back toward the *Bree*, and their cap-

tain turned to give a suitably censored account of the conversation to Lackland. He was a little preoccupied, for the conversation just completed had given rise to several brand new ideas in his mind; but they could be worked out when he had more leisure. Just now he wanted another ride on the tank's roof.

IV.

The bay on whose southern shore the *Bree* was beached was a tiny estuary some twenty miles long and two in width at its mouth. It opened from the southern shore of a larger gulf of generally similar shape some two hundred fifty miles long, which in turn was an offshoot of a broad sea which extended an indefinite distance into the northern hemisphere—it merged indistinguishably with the permanently frozen polar cap. All three bodies of liquid extended roughly east and west, the smaller ones being separated from the larger on their northern sides by relatively narrow peninsulas. The ship's position was better chosen than Barlennan had known, being protected from the northern storms by both peninsulas. Eighteen miles to the west, however, the protection of the nearer and lower of these points ceased; and Barlennan and Lackland could appreciate what even that narrow neck had saved them. The captain was once more ensconced on the tank, this time with a radio clamped beside him; the human being, of course was inside.

To their right was the sea, spreading to the distant horizon beyond the point that guarded the bay. Behind them the beach was similar to that on which the ship lay, a gently sloping strip of sand dotted with the black, rope-branched vegetation that covered so much of Mesklin. Ahead of them, however, the growths vanished almost completely. Here the slope was even flatter and the belt of sand grew ever broader as the eye traveled along it. It was not completely bare, though even the deep-rooted plants were lacking; but scattered here and there on the wave-channeled expanse were dark, motionless relics of the recent storm.

Some were vast, tangled masses of seaweed, or of growths which could claim that name with little strain on the imagination; others were the bodies of marine animals, and some of these were even vaster. Lackland was a trifle startled—not at the size of the creatures, since they presumably were supported in life by the liquid in which they floated, but at the distance they lay from the shore. One monstrous hulk was sprawled over half a mile inland; and the Earthman began to realize just what the winds of Mesklin could do even in this gravity when they had a sixty-mile sweep of open sea in which to build up waves. He would have liked to go to the point where the shore lacked even the pro-

tection of the outer peninsula, but that would have involved a further journey of over a hundred miles.

"What would have happened to your ship, Barlennan, if the waves that reached here had struck it?"

"That depends somewhat on the type of wave, and where we were. On the open sea, we would ride over it without trouble; beached as the *Bree* now is, there would have been nothing left. I did not realize just how high waves could get this close to the Rim, of course—now that I think of it, maybe even the biggest would be relatively harmless, because of its lack of weight."

"I'm afraid it's not the weight that counts most; your first impression was probably right."

"I had some such idea in mind when I sheltered behind that point for the winter, of course. I admit I did not have any idea of the actual size the waves could reach here at the Rim. It is not too surprising that explorers tend to disappear with some frequency in these latitudes."

"This is by no means the worst, either. You have that second point, which is rather mountainous if I recall the photos correctly, protecting this whole stretch."

"Second point? I did not know about that. Do you mean that what I can see beyond the peninsula there is merely another bay?"

"That's right. I forgot you usually stayed in sight of land. You coasted along to this point from the west, then, didn't you?"

"Yes. These seas are almost completely unknown, and no one in his right mind would head straight out into one until the shore line was entirely, or almost entirely, on his charts. There would be no assurance that the other side could be reached during the current season. This particular shore line extends about three thousand miles in a generally westerly direction, as you probably know—I'm just beginning to appreciate what looking at things from above can do for you—and then gradually bends south. It's not too regular; there's one place where you go east again for a couple of thousand miles, but I suppose the actual straight line distance that would bring you opposite my home port is about sixteen thousand miles to the south—a good deal farther coasting, of course. Then about twelve hundred miles across open sea to the west would bring me home. The waters about there are very well known, of course, and any sailor can cross them without more than the usual risks of the sea."

While they had been talking, the tank had crawled away from the sea, toward the monstrous hulk that lay stranded by the recent storm. Lackland, of course, wanted to examine it in detail, since he had so far seen practically none of Mesklin's animal life; Barlennan, too, was willing. He had,

of course, seen many of the monsters that thronged the seas he had traveled all his life, but he was not sure of this one.

Its shape was not too surprising for either of them. It might have been an unusually streamlined whale or a remarkably stout sea snake; the Earthman was reminded of the Zeuglodon that had haunted the seas of his own world thirty million years before. However, nothing that had ever lived on Earth and left fossils for men to study had ever approached the size of this thing. For six hundred feet it lay along the still sandy soil; in life its body had apparently been cylindrical, and over eighty feet in diameter. Now, deprived of the support of the liquid in which it had lived, it bore some resemblance to a wax model that had been left too long in the hot sun. Though its flesh was presumably only about half as dense as that of earthly life, its tonnage was still something to stagger Lackland when he tried to estimate it; and the three-times-Earth-normal gravity had done its share.

"Just what do you do when you meet something like this at sea?" he asked Barlennan.

"I haven't the faintest idea," the Mesklinite replied dryly. "I have seen things like this before, but only rarely. They usually stay in the deeper, permanent seas; I have seen one once only on the surface, and about four cast up as is this one. I do not know what they eat, but apparently they find it far below the surface. I have never heard of a ship's being attacked by one."

"You probably wouldn't," Lackland replied pointedly. "I find it hard to imagine any survivors in such a case. If this thing feeds like some of the whales on my own world, it would inhale one of your ships and probably fail to notice it. Let's have a look at its mouth and find out." He started the tank once more, and drove it along to what appeared to be the head end of the vast body.

The thing had a mouth, and a skull of sorts, but the latter was badly crushed by its own weight. There was enough left, however, to permit the correction of Lackland's guess concerning its eating habits; with those teeth it could only be carnivorous. At first the man did not recognize them as teeth; only the fact that they were located in a peculiar place for ribs finally led him to the truth.

"You'd be safe enough, Barl," he said at last. "That thing wouldn't dream of attacking you. One of your ships would not be worth the effort, as far as its appetite is concerned—I doubt that it would notice anything less than a hundred times the *Bree's* size."

"There must be a lot of meat swimming around in the deeper seas," replied the Mesklinite thoughtfully. "I don't see that it's doing anyone much good, though."

"True enough. Say, what did you

mean a little while ago by that remark about permanent seas? What other kind do you have?"

"I referred to the areas which are still ocean just before the winter storms begin," was the reply. "The ocean level is at its highest in early spring, at the end of the storms, which have filled the ocean beds during the winter. All the rest of the year they shrink again. Here at the Rim, where shore lines are so steep, it doesn't make much difference; but up where weight is decent the shore line may move anywhere from two hundred to two thousand miles between spring and fall." Lackland emitted a low whistle.

"In other words," he said, half to himself, "your oceans evaporate steadily for over four of my years, precipitating it all on the north polar cap, and then get it all back in the five months or so that the northern hemisphere spends going from its spring to autumn. If I was ever surprised at those storms, that ends it." He returned to more immediate matters.

"Barl, I'm going to get out of this tin box. I've been wanting samples of the tissue of Mesklin's animal life ever since we found it existed, and I couldn't very well take a paring from you. Will the flesh of this thing be very badly changed in the length of time it has probably been dead? I suppose you'd have some idea."

"It should still be perfectly edible for us, though from what you have said you could never digest it. Meat usually becomes poisonous after a few hundred days unless it is dried or otherwise preserved, and during all that time its taste gradually changes. I'll sample a bit of this, if you'd like."

Without waiting for an answer and without even a guilty glance around to make sure that none of his crew had wandered in this direction, Barlennan launched himself from the roof of the tank toward the vast bulk beside it. He misjudged badly, sailing entirely over the huge body, and for just an instant felt a twinge of normal panic; but he was in full control of himself before he landed on the farther side. He leaped back again, judging his distance better this time, and waited while Lackland opened the door of his vehicle and emerged.

There was no air lock on the tank; the man was still wearing pressure armor, and had simply permitted Mesklin's atmosphere to enter after closing his helmet. A faint swirl of white crystals followed him out—ice and carbon dioxide, frozen out of the Earth-type air inside as it cooled to Mesklin's bitter temperature. Barlennan had no sense of smell, but he felt a burning sensation in his breathing pores as a faint whiff of oxygen reached him, and jumped hastily backward. Lackland guessed correctly at the cause of his action and apologized profusely for not giving proper warning.

"It is nothing," the captain replied. "I should have foreseen it—I got the

same sensation once before when you left the hill where you live, and you certainly told me often enough how the oxygen you breathe differs from our hydrogen . . . you remember, when I was learning your language."

"I suppose that's true. Still, I could hardly expect a person who hadn't grown up accustomed to the idea of different worlds and different atmospheres to remember the possibility all the time. It was still my fault. However, it seems to have done you no harm; I don't yet know enough about the life chemistry of Mesklin even to guess just what it might do to you. That's why I want samples of this creature's flesh. I suppose, with this air, you'd have to have what we call a reduction metabolism, but don't worry about what I mean by that. Let's see what sort of meat this thing has."

Lackland had a number of instruments in a mesh pouch on the outside of his armor, and while he was fumbling among them with his pressure gauntlets Barlennan proceeded to take the first sample. Four sets of pincers shredded a portion of skin and underlying tissue and passed it along to his mouth; for a few moments he chewed reflectively.

"Not at all bad," he remarked at last. "If you don't need all of this thing for your tests, it might be a good idea to call the hunting parties over here. They'd have time to make it before the storm gets going again, I should think, and there'll certainly be more meat than they could reasonably expect to get any other way."

"Good idea," Lackland grunted. He was giving only part of his attention to his companion; most of it was being taken up by the problem of getting the point of a scalpel into the mass before him. Even the suggestion that he might be able to use the entire monstrous body in a laboratory investigation—the Mesklinite did possess a sense of humor—failed to distract him.

He had known, of course, that living tissue on this planet must be extremely tough. Small as Barlennan and his people were, they would have been flattened into senseless pulp under Mesklin's polar gravity had their flesh been of mere Earthly consistency. He had expected some difficulty in getting an instrument through the monster's skin; but he had more or less unthinkingly assumed that, once through, his troubles would be over in that respect. He was now discovering his error; the meat inside seemed to have the consistency of teak. The scalpel was of a superhard alloy which would have been difficult to dull against anything as long as mere muscular strength was employed, but he could not drive it through that mass and finally had to resort to scraping. This produced a few shreds which he sealed in a collecting bottle.

"Is any part of this thing likely to be softer?" he asked the interested Mesklinite as he looked up from this

task. "I'm going to need power tools to get enough out of this body to satisfy the boys on Toorey."

"Some parts inside the mouth might be a little more tractable," Barlennan replied. "However, it would be easier for me to nip off pieces for you, if you'll tell me the sizes and parts you want. Will that be all right, or do your scientific procedures demand that the samples be removed with metal instruments for some reason?"

"Not that I know of—thanks a lot; if the bio boys don't like it they can come down and do their own carving," returned Lackland. "Go right ahead. Let's follow your other suggestion, too and get something from the mouth; I'm not really sure I'm through skin here." He waddled painfully around the head of the stranded behemoth to a point where gravity-distorted lips had exposed teeth, gums, and what was presumably a tongue. "Just get bits small enough to go in these bottles without crowding." The Earthman tentatively tried the scalpel once more, finding the tongue somewhat less obdurate than the earlier sample, while Barlennan obediently nipped off fragments of the desired size. An occasional piece found its way to his mouth —he was not really hungry, but this was fresh meat—but in spite of this drain the bottles were soon filled.

Lackland straightened up, stowing the last of the containers as he did so, and cast a covetous glance at the pillarlike teeth. "I suppose it would take blasting gelatine to get one of those out," he remarked rather sadly.

"What is that?" asked Barlennan.

"An explosive—a substance that changes into gas very suddenly, producing loud noise and shock. We use such material for digging, removing undesirable buildings or pieces of landscape, and sometimes in fighting."

"Was that sound an explosive?" Barlennan asked.

For an instant Lackland made no answer. A *boom!* of very respectable intensity, heard on a planet whose natives are ignorant of explosives and where no other member of the human race is present can be rather disconcerting, especially when it picks such an incredibly apt time to happen; and to say that Lackland was startled would be putting it mildly. He could not judge accurately the distance or size of the explosion, having heard it through Barlennan's radio and his own sound disks at the same time; but a distinctly unpleasant suspicion entered his mind after a second or two.

"It sounded very much like one," he answered the Mesklinite's question somewhat belatedly, even as he started to waddle back around the head of the dead sea monster to where he had left the tank. He rather dreaded what he would find. Barlennan, more curious than ever, followed by his more natural method of travel, crawling.

For an instant, as the tank came in sight, Lackland felt an overwhelming

relief; but this changed to an equally profound shock as he reached the door of the vehicle. The floor inside had, for practical purposes, ceased to exist.

What remained of it consisted of upcurled scraps of thin metal, some still attached at the bases of the walls and others tangled among the controls and other interior fittings. The driving machinery which had been under the floor was almost completely exposed, and a single glance was enough to tell the dismayed Earthman that it was hopelessly wrecked. Barlennan was intensely interested in the whole phenomenon.

"I take it you were carrying some explosive in your tank," he remarked. "Why did you not use it to get the material you wanted from this animal? And what made it act while it was still in the tank?"

"You have a genius for asking difficult questions," Lackland replied. "The answer to your first one is that I was not carrying any; and to the second, your guess is as good as mine at this point."

"But it must have been something you were carrying," Barlennan pointed out, quite reasonably. "Even I can see that whatever it was happened under the floor of your tank, and wanted to get out; and we don't have things that act like that on Mesklin."

"Admitting your logic, there was nothing under that floor that I can imagine blowing up," replied the man. "Electric motors and their accumulators just aren't explosive. That region is not normally used for stowage, so it hardly seems likely that whoever used the tank last could have left anything there by mistake. A close examination will undoubtedly show traces of whatever it was if it was in any sort of container, since practically none of the fragments seem to have gone outside the tank—but I have a rather worse problem to solve first, Barl."

"What is that?"

"I am eighteen miles from food supplies, other than what is carried in my armor. The tank is ruined; and if there was ever an Earthman born who could walk eighteen miles in eight-atmosphere heated armor under three gravities, I'm certainly not the one. My air will last indefinitely with these Alga gills and enough sunlight, but I'd starve to death before I made the station."

"Can't you call your friends on the faster moon, and have them send a rocket to carry you back?"

"I could; or more probably they already know, if anyone is in the radio room to hear this conversation. The trouble is if I have to get that sort of help Doc Rosten will certainly make me go back to Toorey for the winter; I had trouble enough as it was persuading him to let me stay. He'll have to hear about the tank, but I want to tell him from the station—after getting back there without his help. There just isn't energy around here to get me back though; and even if I

could get more food into the containers in this armor without letting your air in, you couldn't get into the station to get the food."

"Let's call my crew, anyway," Barlennan remarked. "They can use the food that's here—or as much of it as they can carry. I have another idea, too, I think."

"We are coming, captain." Dondragmer's voice came from the radio, startling Lackland, who had forgotten his arrangement to let each radio hear the others, and startling the commander himself, who had not realized that his mate had learned so much English. "We will be with you in a few days at most; we took the same general direction as the Flyer's machine when we started." He gave this information in his native language; Barlennan translated for Lackland's benefit.

"I can see that *you* won't be hungry for quite a while," the man replied, glancing somewhat ruefully at the mountain of meat beside them, "but what was this other idea of yours? Will it help with my problem?"

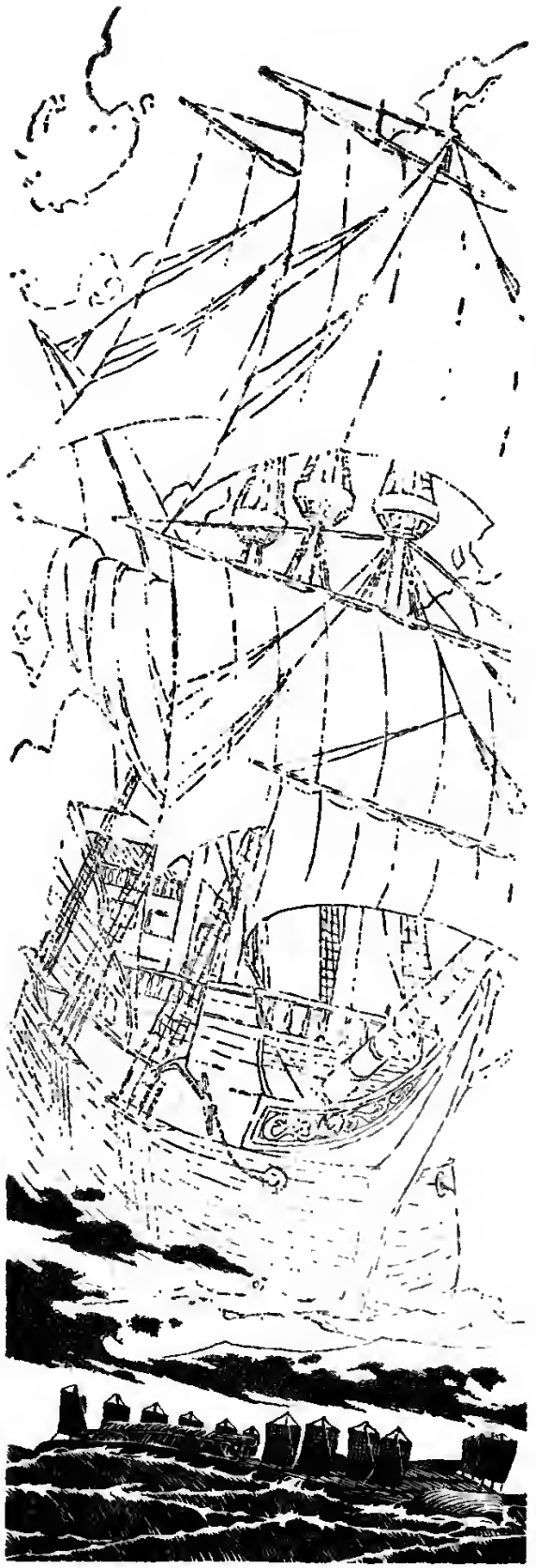
"A little, I think." The Mesklinite would have smiled had his mouth been sufficiently flexible. "Will you please step on me?"

For several seconds Lackland stood rigid with astonishment at the request; after all, Barlennan looked more like a caterpillar than anything else, and when a man steps on a caterpillar—then he relaxed, and even grinned.

"All right, Barl. For a moment I'd forgotten the circumstances." The Mesklinite had crawled over to his feet during the pause; and without further hesitation Lackland took the requested step. There proved to be only one difficulty.

Lackland had a mass of about one hundred sixty pounds. His armor, an engineering miracle in its own way, was about as much more. On Mesklin's equator, then, man and armor *weighed* approximately nine hundred fifty pounds—he could not have moved a step without an ingenious servo device in the legs—and this weight was only about a quarter greater than that of Barlennan in the polar regions of his planet. There was no difficulty for the Mesklinite in supporting that much weight; what defeated the attempt was simple geometry. Barlennan was, in general, a cylinder a foot and a half long and two inches in diameter; and it proved a physical impossibility for the armored Earthman to balance on him even when he stood still. Any attempt on the tiny being's part to walk with his top-heavy load would be even more certain to send it toppling, a risk which Lackland had no intention of taking under triple gravity.

The Mesklinite was stumped; this time it was Lackland who thought of a solution. Some of the side plates on the lower part of the tank had been sprung by the blast inside; and under Lackland's direction Barlennan, with



considerable effort, was able to wrench one completely free. It was about two feet wide and six long, and with one end bent up slightly by the native's powerful nippers, it made an admirable sled. Lackland was able to stand on it with ease, and pointed out how much more meat the crew could take back to the *Bree* if they made a number of the devices. That was while Barlennan was nipping a control cable out of the wrecked tank—its oxygen had long since dissipated, of course—to serve as a towline. A few moments later the Earthman stopped talking, rather suddenly.

Barlennan, on this part of his planet, weighed about three pounds. He simply did not have the necessary traction to tow the device—and the nearest plant which might have served as an anchor was a quarter of a mile away. Lackland was glad that a red face had no particular meaning to the natives of this world, for the sun happened to be in the sky when this particular fiasco occurred. They had been working both day and night, since the smaller sun and the two moons had furnished ample light in the absence of the storm clouds.

Temporarily, after a long pause during which neither had any more ideas, Lackland forgot his worries while he stayed his hunger with food from his armor; but he could not really ignore the fact that there was very little more of this supply. He did not eat all he really wanted.

V.

The crew's arrival, days later, put an end to the inactivity. It also solved Lackland's problem almost at once.

The mere number of natives, of course, was of little help; twenty-one Mesklinites still did not have traction enough to move the loaded sled. Barlennan thought of having them carry it, placing a crew member under each corner; and he went to considerable trouble to overcome the normal Mesklinite conditioning against getting under a massive object. When he finally succeeded in this, however, the effort proved futile; the metal plate was not thick enough for that sort of treatment, and buckled under the armored man's weight so that all but the supported corner was still in contact with the ground.

Dondragmer, with no particular comment, spent the time that this test consumed in paying out and attaching together the lines which were normally used with the hunting nets. They proved, in series, more than long enough to reach the nearest plants; and the roots of these growths, normally able to hold against the wŏrst that Mesklin's winds could offer, furnished all the support needed. Four days later a train of sledges, made from all the accessible plates of the tank, started back toward the *Bree* with Lackland and a tremendous load of meat aboard; and at a fairly steady rate of a mile an hour, reached the ship in sixty-one days. Two more days of work, with more crew members assisting, got Lackland's armor through the vegetation growing between the ship and his dome, and delivered him safely at the air lock. It was none too soon; the wind had already picked up to a point where the assisting crew had to use ground lines a good deal of the time in getting back to the *Bree*, and clouds were once again whipping across the sky.

Lackland ate, before bothering to report officially what had happened to the tank. He wished he could make the report more complete; he felt somehow that he should know what had actually happened to the vehicle. It was going to be very difficult to accuse someone on Toorey of inadvertently leaving a cake of gelatin under the tank's floor, and he had as great a dislike as anyone for being laughed at.

He had actually pressed the call button on the station-to-satellite set when the answer struck him; and when Dr. Rosten's lined face appeared on the screen he knew just what to say.

"Doc, there's a spot of trouble with the tank."

"So I understand. Is it electrical or mechanical? Serious?"

"Basically mechanical, though the electrical system had a share. I'm afraid it's a total loss; what's left of it is stranded about eighteen miles from here, west, near the beach."

"Very nice. This planet is costing a

good deal of money one way and another. Just what happened—and how did you get back? I know you've been down there long enough to be in pretty sharp muscular condition, but I don't think you could walk eighteen miles in armor under that gravity."

"I didn't—Barlennan and his crew towed me back. As nearly as I can figure out about the tank, the floor partition between cockpit and engine compartment wasn't air-tight. When I got out to do some investigating, Mesklin's atmosphere—high-pressure hydrogen—began leaking in and mixing with the normal air under the floor. It did the same in the cockpit, too, of course, but practically all the oxygen was swept out through the door from there and diluted below danger point before anything happened. Underneath—well, there was a spark before the oxygen went."

"I see. What caused the spark? Did you leave motors running when you went out?"

"Certainly—the steering servos, dynamotors, and so on. I'm glad of it, too; if I hadn't, the blast would probably have occurred after I got back in and turned them on."

The director of the Recovery Force looked a trifle disgruntled. "Did you have to get out at all?" Lackland thanked his stars that Rosten was a biochemist.

"I didn't exactly have to, I suppose. I was getting tissue samples from a six hundred foot whale stranded on the beach out there. I thought someone might—"

"Did you bring them back?" snapped Rosten without letting Lackland finish.

"I did. Come down for them when you like—and have we another tank you could bring along?"

"We have. I'll consider letting you have it when winter is over; I think you'll be safer inside the dome until then. What did you preserve the specimens with?"

"Nothing special—hydrogen—the local air. I supposed that any of our regular preservatives would ruin them from your point of view. You'd better come for them fairly soon; Barlennan says that meat turns poisonous after a few hundred days, so I take it they have microorganisms here."

"Be funny if they hadn't. Stand by; I'll be down there in a couple of hours." Rosten broke the connection without further comment about the wrecked tank, for which Lackland felt reasonably thankful. He went to bed, not having slept for nearly twenty-four hours.

He was awakened—partially—by the arrival of the rocket. Rosten had come down in person, which was not surprising. He did not even get out of his armor; he took the bottles, which Lackland had left in the air lock to minimize the chance of oxygen contamination, took a look at Lackland, realized his condition, and brusquely ordered him back to bed.

"This stuff was probably worth the tank," he said briefly. "Now get some sleep. You have some more problems to solve—I'll talk to you again when there's a chance you'll remember what I say. I hope none of your native friends were near the dome; we landed pretty close. See you later." The airlock door closed behind him.

Lackland, startled awake for the moment, almost leaped to his local radio; but he was asleep again almost before reaching his water-filled "bunk" after receiving Barlennan's assurance that all the crew were aboard the *Bree.* The Earthman was too tired even to feel guilty for not having warned the natives of the rocket's approach.

He did not, actually, remember Rosten's parting remarks; but he was reminded, many hours later, when he had slept and eaten once more.

"This winter, when Barlennan can't hope to travel, will last only another three and a half months," the assistant director started almost without preamble. "We have several reams of telephotos up here which are not actually fitted into a map, although they've been collated as far as general location is concerned. We couldn't make a real map because of interpretation difficulties. Your job for the rest of this winter will be to get in a huddle with those photos and your friend Barlennan, turn them into a usable map, and decide on a route which will take him most quickly to the material we want to salvage."

"But Barlennan doesn't want to get there quickly. This is an exploring-trading voyage as far as he's concerned, and we're just an incident. All we've been able to offer him in return for that much help is a running sequence of weather reports, to help in his normal business."

"I realize that. That's why you're down there, if you remember; you're supposed to be a diplomat. I don't expect miracles—none of us do—and we certainly want Barlennan to stay on good terms with us; but there's two billion dollars worth of special equipment on that rocket that couldn't leave the pole, and recordings that are literally priceless. There's been nothing done in any gravity field even slightly comparable to that one; we *must* have the records back, even granting that Barlennan couldn't possibly transport the equipment itself for the most part. There are more research projects stymied and screaming for that data—"

"I know, and I'll do my best," Lackland cut in, "but I could never make the importance of it clear to a native—and I don't mean to belittle Barlennan's intelligence; he just hasn't the background. You keep an eye out for breaks in these winter storms, so he can come up here and study the pictures whenever possible."

"Couldn't you rig some sort of outside shelter next to a window, so he could stay up even during bad weather?"

"I suggested that once, and he won't leave his ship and crew at such times. I see his point."

"I suppose I do, too. Well, do the best that you can—you know what it means. We should be able to learn more about gravity from that stuff than anyone since Einstein." Rosten signed off, and the winter's work began.

The grounded research rocket, which had landed under remote control near Mesklin's south pole and had failed to take off after presumably recording its data, had long since been located by its telemetering transmitters. Choosing a sea and/or land route to it from the vicinity of the *Bree's* winter quarters, however, was another matter. The ocean travel was not too bad; some forty or forty-five thousand miles of coastal travel, nearly half of it in waters already known to Barlennan's people, would bring the salvage crew as close to the helpless machine as this particular chain of oceans ever got. That, unfortunately, was some four thousand miles; and there simply were no large rivers near that section of coast which would shorten the overland distance significantly.

There was such a stream, easily navigable by a vessel like the *Bree*, passing within fifty miles of the desired spot; but it emptied into an ocean which had no visible connection with that which Barlennan's people sailed. The latter was a long, narrow, highly irregular chain of seas extending from somewhat north of the equator in the general neighborhood of Lackland's station almost to the equator on the opposite side of the planet, passing fairly close to the south pole on the way—fairly close, that is, as distances on Mesklin went. The other sea, into which the river near the rocket emptied, was broader and more regular in outline; the river mouth in question was at about its southernmost point, and it also extended to and past the equator, merging at last with the northern ice cap. It lay to the east of the first ocean chain, and appeared to be separated from it by a narrow isthmus extending from pole to equator—narrow, again by Mesklinite standards. As the photographs were gradually pieced together, Lackland decided that the isthmus varied from about two to nearly seven thousand miles in width. The narrow portion was a few thousand miles south of Barlennan's home country, and was perfectly well known to the commander; for that reason they had started their map-making in that region.

"What we could use, Barl, is a passage from one of these seas into the other," remarked Lackland one day. The Mesklinite, sprawled comfortably on his ledge outside the window, gestured agreement silently. It was past midwinter now, and the greater sun becoming perceptibly dimmer as it

arched on its swift path across the sky to the north. "Are you sure that your people know of none? After all, most of these pictures were taken in the fall, and you say that the ocean level is much higher in the spring."

"We know of none, at any season," replied the captain. "We know something, but not much, of the ocean you speak of; there are too many different nations on the land between for very much contact to take place. A single caravan would be a couple of years on the journey, and as a rule they don't travel that far. Goods pass through many hands on such a trip, and it's a little hard to learn much about their origin by the time our traders see them in the western seaports of the isthmus. If any passage such as we would like exists at all, it must be here near the Rim where the lands are almost completely unexplored. Our map—the one you and I are making—does not go far enough yet. In any case, there is no such passage south of here during the autumn; I have been along the entire coastline as it was then, remember. Perhaps, however, this very coast reaches over to the other sea; we have followed it eastward for several thousand miles, and simply do not know how much farther it goes."

"As I remember, it curves north again a couple of thousand miles past the outer cape, Barl—but of course that was in the autumn, too, when I saw it. It's going to be quite troublesome, this business of making a usable map of your world. It changes too much. I'd be tempted to wait until next autumn so that at least we could use the map we made, but that's four of my years away. I can't stay here that long."

"You could go back to your own world and rest until the time came—though I would be sorry to see you go."

"I'm afraid that would be a rather long journey, Barlennan."

"How far?"

"Well—your units of distance wouldn't help much. Let's see. A ray of light could travel around Mesklin's 'rim' in . . . ah . . . four fifths of a second." He demonstrated this time interval with his watch, while the native looked on with interest. "The same ray would take a little over eleven of my years; that's—about two and a quarter of yours, to get from here to my home."

"Then your world is too far to see? You never explained these things to me before."

"I was not sure we had covered the language problem well enough. No, my world cannot be seen, but I will show you my sun when winter is over and we have moved to the right side of yours." The last phrase passed completely over Barlennan's head, but he let it go. The only suns he knew were the bright Belne whose coming and going made day and night, and the fainter Esstes, which was visible in the night sky at this moment. In a little

less than half a year, at midsummer, the two would be close together in the sky, and the fainter one hard to see; but Barlennan had never bothered his head about the reason for these motions. He did recall, now that he thought of it, that his great-grandfather had said something about the conjunction of suns formerly occurring in winter instead of summer, but the knowledge seemed unimportant. He decided not to mention it to the Flyer; it hardly seemed germane to the subject of map-making, from which they seemed to have wandered slightly.

Lackland had put down the photograph he was holding, and seemed immersed in thought. Much of the floor of the room was already covered with loosely-fitted pictures; the region best known to Barlennan was already mapped fairly well. However, there was yet a long, long way to go before the area occupied by the human outpost would be included; and the man was already being troubled by the refusal of the photographs to fit together. Had they been of a spherical or nearly spherical world like Earth or Mars, he could have applied the proper projection correction almost automatically on the smaller map which he was constructing, and which covered a table at one side of the chamber; but Mesklin was not even approximately spherical. As Lackland had long ago recognized, the proportions of the Bowl on the *Bree*—Barlennan's equivalent of a terrestrial globe—were approximately right. It was six inches across and one and a quarter deep, and its curvature was smooth but far from uniform.

To add to the difficulty of matching photographs, much of the planet's surface was relatively smooth, without really distinctive topographic feature; and even where mountains and valleys existed, the different shadowing of adjacent photographs made comparison a hard job. The habit of the brighter sun of crossing from horizon to horizon in less than nine minutes had seriously disarranged normal photographic procedure; successive pictures in the same series were often illuminated from almost opposite directions.

"We're not getting anywhere with this, Barl," Lackland said wearily. "It was worth a try as long as there might be short cuts, but you say there are none. You're a sailor, not a caravan master; that four thousand miles overland right where gravity is greatest is going to stump us."

"The knowledge that enables you to fly, then, cannot change weight?"

"It cannot." Lackland smiled. "The instruments which are on that rocket grounded at your south pole should have readings which might teach us just that, in time. That is why the rocket was sent, Barlennan; the poles of your world have the most terrific surface gravity of any spot in the Universe so far accessible to us. There are a number of other worlds even more

massive than yours, and closer to home, but they don't spin the way Mesklin does; they're too nearly spherical. We wanted measures in that tremendous gravity field—all sorts of measures. The value of the instruments that were designed and sent on that trip cannot be expressed in numbers we both know; when the rocket failed to respond to its take-off signal, it rocked the governments of ten planets. We *must* have that data, even if we have to dig a canal to get the *Bree* into the other ocean."

"But what sort of devices were on board this rocket?" Barlennan asked. He regretted the question almost in the same instant; the Flyer might wonder at such specific curiosity, and come to suspect the captain's true intentions. However, Lackland appeared to take the query as natural.

"I'm afraid I can't tell you, Barl. You simply have no background which would give words like electron and neutrino and magnetism and quantum any meaning at all. The drive mechanism of the rocket might mean a little more to you, but I doubt it." In spite of Lackland's apparent freedom from suspicion, Barlennan decided not to pursue the subject.

"Would it not be well," he said, "to seek the pictures that show the shore and inland regions east of here? If you really plan to dig a canal, you will have to decide on a route."

"I'm afraid I did not mean the canal idea seriously," Lackland replied. "It would be impractical even for our machines, unless the two bodies of water came almost together. There is still some chance, of course, that they do meet; I don't pretend to have memorized the whole area. Maybe down next to the ice cap—how much cold can you people stand?"

"We are uncomfortable when the sea freezes, but we can stand it—if it does not get too much colder. Why?"

"It's just possible you may have to crowd the northern ice cap pretty closely. We'll see, though. Just a moment; one of these first few pictures in the K-18 series ought to show this neighborhood." The Flyer riffled through the stack of prints, still taller than Barlennan was long, and eventually extracted a thin sheaf. "One of these—" his voice trailed off for a few moments. "Here we are. This was taken from the inner edge of the ring, Barl, over six hundred miles up, with a narrow-angle telephoto lens. You can see the main shoreline, and the big bay, and here, on the south side of the big one, the little bay where the *Bree* is beached. This was taken before this station was built—though it wouldn't show anyway.

"Now let's start assembling again. The sheet east of this—" he trailed off again, and the Mesklinite watched in fascination as a readable map of the lands he had not yet reached took form below him.

For a time it seemed they were to

be disappointed, for the shore line gradually curved northward as Lackland had thought; indeed, some twelve hundred miles to the west and four or five hundred north, the ocean seemed to come to an end—the coast curved westward again. A vast river emptied into it at this point, and with some hope at first that this might be a strait leading to the eastern sea Lackland began fitting the pictures that covered the upper reaches of the mighty stream. He was quickly disabused of this idea, by the discovery of an extensive series of rapids some two hundred and fifty miles upstream; east of these, the great river dwindled rapidly. Numerous smaller watercourses emptied into it; apparently it was the main artery for the drainage system of a vast area of the planet. Interested by the speed with which it broke up into smaller rivers, Lackland continued building the map eastward, watched with interest by Barlennan.

The main stream, as far as it could be distinguished, had shifted direction slightly, flowing from a more southerly direction. Carrying the mosaic of pictures in this direction they found a range of very fair-sized mountains, and the Earthman looked up with a rueful shake of his head. Barlennan had come to understand the meaning of this gesture.

"Do not stop yet!" the captain expostulated. "There is a similar range along the center of my country, which is a fairly narrow peninsula. At least build the picture far enough to determine how the streams flow on the other side of the mountains."

Lackland, though not optimistic—he recalled the South American continent on his own planet too clearly to assume any symmetry of the sort the Mesklinite seemed to expect—complied with the native's suggestion. The range proved to be fairly narrow, extending roughly east-northeast by west-southwest; and rather to the man's surprise the numerous "water" courses on the opposite side began very quickly to show a tendency to come together in one vast river. This ran roughly parallel with the range for mile after mile, broadening as it went, and hope began to grow once more. It reached a climax five hundred miles downstream, when what was now a vast estuary merged indistinguishably with the "waters" of the eastern ocean.

Working feverishly, scarcely stopping for food or even the rest he so badly needed in Mesklin's savage gravity, Lackland worked on; and eventually the floor of the room was covered by a new map—a rectangle representing some two thousand miles in an east-west line and half as far in the other dimension. The great bay and tiny cove where the *Bree* was beached showed clearly at its western end; much of the other was occupied by the featureless surface of the eastern sea. Between lay the land barrier.

It was narrow; at its narrowest, some five hundred miles north of the equator, it was a scant eight hundred miles from coast to coast, and this distance was lessened considerably if one measured from the highest usable points of the principal rivers. Perhaps three hundred miles, part of it over a mountain range, was all that lay between the *Bree* and a relatively easy path to the distant goal of the Earthmen's efforts. Three hundred miles; a mere step, as distances on Mesklin went.

Unfortunately, it was decidedly more than a step to a Mesklinite sailor. The *Bree* was still in the wrong ocean; Lackland, after staring silently for many minutes at the mosaic about him, said as much to his tiny companion. He expected no answer, or at most a dispirited agreement; his statement was self-evidently true—but the native fooled him.

"Not if you have more of the metal on which we brought you and the meat back!" was Barlennan's instantaneous reply.

VI.

For another long moment Lackland stared out the window into the sailor's eyes, while the implications of the little creature's remark sank into his mind; then he stiffened into something as closely approaching an alert attitude as the gravity permitted.

"You mean you would be willing to tow the *Bree* overland on a sled, as you did me?"

"Not exactly. The ship outweighs us very much, and we would have the same trouble with traction that we did before. What I had in mind was *your* towing, with another tank."

"I see. I—see. It would certainly be possible, unless we hit terrain that the tank couldn't pass. But would you and your crew be willing to make such a journey? Would the extra trouble and distance from your home be repaid by the little we could do for you?"

Barlennan extended his pincers in a smile.

"It would be much better than what we originally planned. There are trading goods that come from the shores of the eastern ocean to our country, by the long caravan routes overland; by the time they reach the ports on our own sea, they are already fabulously expensive, and an honest trader cannot make a decent profit from them. This way, if I picked them up directly—well, it would be certainly very worth while indeed, for me. Of course, you would have to promise to bring us back across the isthmus when we returned."

"That would certainly be fair enough, Barl; I'm sure my people will gladly agree to it. But how about the land travel itself? This is country you know nothing about, as you have said; might not your crew be afraid of unknown land, and high hills over them, and maybe animals larger than can

possibly grow in your part of the world?"

"We have faced dangers before," the Mesklinite replied. "I was able to get used to high places—even the top of your tank. As for animals, the *Bree* is armed with fire, and none that walk on land could be as large as some that swim the oceans."

"That's true enough, Barl. Very well. I was not trying to discourage you, goodness knows; but I wanted to be sure you had thought the matter over before you embarked on such a project. It's hardly one that can be backed out of in the middle."

"That I can readily understand, but you need not fear, Charles. I must return to the ship now; the clouds are gathering again. I will tell the crew what we are going to do; and lest the thoughts of fear should come to any of them, I will remind them that the profits of the voyage will be shared according to rank. There is no member of that crew who would put fear in the way of wealth."

"And you?" Lackland chuckled as he asked the question.

"Oh, I'm not afraid." The Mesklinite vanished into the night as he spoke the words, and Lackland was never sure just how he meant them. He did not waste too much time in thinking about it; he turned immediately to the larger transmitter and began calling the base on Toorey.

Rosten, when he heard the new plan, made a number of caustic remarks to the effect that Lackland could certainly be counted on for ideas that would give him use of a tank; even when the younger man pointed out that the idea had been Barlennan's he was not completely pacified.

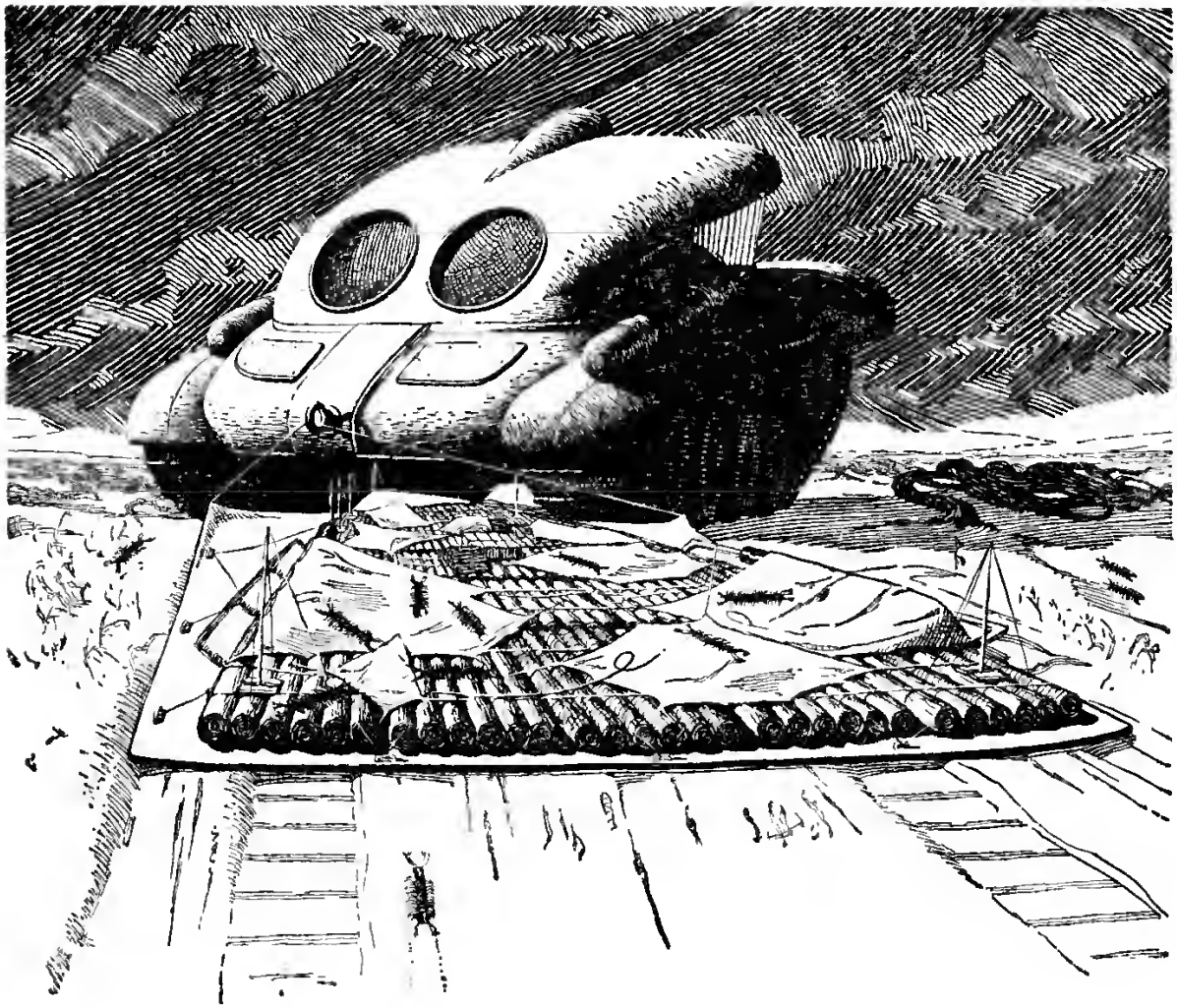
"It seems as though it should work, though," he admitted grudgingly. "Just what sort of sledge are we supposed to build for this ocean liner of your friend's? How big is it, again?"

"The *Bree* is about forty feet long and fifteen across; I suppose it draws five or six inches. It's made of a lot of rafts about three feet long and half as wide, roped together so they can move fairly freely—I can guess why, on this world."

"So can I. If a ship that long had its two ends supported by waves while the middle hung free, up near the pole, it would be in pieces before long whether it started that way or not. How is it driven?"

"Sails; there are masts on twenty or thirty of the rafts. I suspect there may be centerboards on some of them too, retractable so the ship can be beached; but I never asked Barlennan. I don't really know how far advanced the art of sailing is on this world, but from the casual way in which he speaks of crossing long stretches of open ocean, I assume they know about beating into a wind."

"Seems reasonable. Well, we'll build something out of light metal here on the moon, and cart it down to you



when we finish."

"You'd better not bring it down until winter's over. If you leave it inland it'll get lost under the snow and dust—I wish that volcano would stop; I like white snow—and if you drop it at the seashore someone may have to dive for it, if the water line goes up the way Barlennan expects."

"If it's going to, why is it waiting so long? The winter is more than half over, and there's been a fantastic amount of precipitation in the parts of the southern hemisphere that we can see."

"Why ask me things like that? There are meteorologists on the staff, I believe, unless they've gone crazy trying to study this planet. I have my own worries. When do I get another tank?"

"When you can use it; after winter is over, as I said. And if you blow that one up it'll be no use howling for another, because there isn't one closer than Earth unless the Krueger 60 expedition can spare one. I wouldn't count on that. See you later." Rosten

ended the conversation in his usual abrupt manner.

Barlennan, hearing the gist of this conversation at his next visit some hundreds of days later, was perfectly satisfied. His crew was enthusiastic about the proposed trip; they might, as he had implied, be lured by the prospective gain, but there was liberally distributed among them a share of the plain love of adventure which had carried Barlennan so far into unknown territory. The commander did not give them credit for it even in his own mind, but a little thought would have forced him to admit that no other type of person could have stayed with him for any length of time; and practically all the *Bree's* present crew were veterans in Barlennan's service.

"We will go as soon as the storms break," he said to Lackland. "There will still be much snow on the ground; that will help where the course lies over land different from the loose sand of the beach."

"I don't think it will make much difference to the tank," replied Lackland.

"It will to us," pointed out Barlennan. "I admit it would not be dangerous to be shaken off the deck, but it would be annoying in the middle of a meal. Have you decided what would be the best course to follow across the land?"

"I've been working on it." The man brought out the map that was the result of his efforts. "The shortest route, that we discovered together, has the disadvantage of requiring that I tow you over a mountain range. It might be possible, but I don't like to think of the effects on your crew. I don't know how high those mountains are, but any is too much on this world.

"I've worked out this route, which I've shown by a red line. It follows up the river that empties into the big bay on this side of the point, for about twelve hundred miles—not counting the small curves in the river, which we probably won't have to follow. Then it goes straight across country for another four hundred or so, and reaches the head of another river. You could probably sail down that if you wanted, or have me keep on towing—whichever would be faster or more comfortable for you. The whole thing is a good deal longer than that first one, but has the advantage of being *possible* as far as I can see from the pictures. Its worst feature is that so much of it runs three or four hundred miles south of the equator—another half gravity or more for me to take. I can handle it, though."

"If you are sure of that, I would say that this is indeed the best way." Barlennan gave his statement after careful study of the map. "The ground must rise to some extent in the middle of the isthmus, or there would not be such a definite watershed; but as you say, there seem to be no indications of actual mountains. Your towing will

probably be faster than sailing, at least in the river where there will probably be no room to tack." He had to use his own language for the last word; Lackland received the explanation of its meaning with satisfaction. He had guessed correctly about the extent of nautical progress among Barlennan's people it seemed.

With the route agreed on, there was little more for Lackland to do while Mesklin drifted along its orbit toward the next equinox. That would not be too long, of course; with the southern hemisphere's midwinter occurring almost exactly at the time the giant world was closest to its sun, orbital motion during fall and winter was extremely rapid. Each of those seasons was a shade over two Earthly months in length—spring and summer, on the other hand, each occupied some eight hundred and thirty Earth days, roughly twenty-six months. There should be plenty of time for the voyage itself.

Lackland's enforced idleness was not shared aboard the *Bree*. Preparations for the overland journey were numerous, and complicated by the fact that no member of the crew knew exactly what the ship would have to face. They might have to make the entire journey on stored food; there might be animal life along the way sufficient not only to feed them but to provide trading material if its skins and bones were of the right sort. The trip might be as safe as the sailors avowedly believed all land journeys to be, or they might face dangers from both the terrain and the creatures inhabiting it. About the first they could do little; that was the Flyer's responsibility. Concerning the second, weapons were brought to a high degree of readiness. Bigger clubs than even Hars or Terblannen could swing up in the higher latitudes were manufactured; some of the plants which stored crystals of chlorine in their stems were found, and the flame tanks replenished from them. There were, of course, no projectile weapons; the idea had never developed on a world where none of the inhabitants had ever seen a solid, unsupported object because it fell too fast to be visible. A .50-caliber bullet fired horizontally at Mesklin's pole would drop over one hundred feet in its first hundred yards of travel, and would have fallen considerably farther than it had gone horizontally before attaining a distance of half a mile from the muzzle.

Barlennan, since meeting Lackland, had come to have some idea of the "throw" concept and had even considered asking the Flyer about the possibility of weapons based on the principle; but he had decided to stick to more familiar arms. Lackland, on his part, had done a little wondering about the possible results of meeting a race, on their trip across the isthmus, which had developed the bow and arrow. He did a little more than Bar-

lennan with the thought; he outlined the situation to Rosten and asked that the towing tank be equipped with a 40-millimeter gun with thermite and explosive shells. After the usual grumbling Rosten had acquiesced; his objections were justified in a way, since the party had only one such weapon. However, the expedition was scientific rather than military and few of its members had cared whether the gun were brought along in the first place, so the possibility of its loss now was regarded with little anxiety on the whole.

The sled was finished easily and quickly; large amounts of sheet metal were available, and the structure was certainly not complicated. Following Lackland's advice it was not brought to the surface of Mesklin immediately, since the storms were still depositing their loads of ammonia-tainted methane snow and volcano dust. The ocean level had still not risen appreciably near the equator, and the meteorologists had been making unkind remarks at first about Barlennan's truthfulness and linguistic ability; but as sunlight reached farther and farther into the southern hemisphere with the approach of spring, and new photographs were secured and compared with those of the preceding fall, the weather men grew silent and were observed wandering around the station muttering distractedly to themselves.

The sea level in the higher latitudes had already risen several hundreds of feet, as the native had predicted, and was still rising visibly as the days went by. The phenomenon of widely differing sea levels at the same time on the same planet was a little outside the experience of Earth-trained meteorologists, and none of the non-human scientists with the expedition could throw any light on the matter, either. Lackland was no help at all when they appealed to him; Barlennan had not told him anything that seemed to offer an explanation, and Lackland himself was not particularly interested in the matter. He agreed casually to ask the native about it when the opportunity occurred, and promptly forgot the question. The weather men were still racking their brains when the sun's diurnal arc eased southward past the equator and spring officially began in Mesklin's southern hemisphere.

The storms had decreased tremendously both in frequency and intensity long before this time, partly because the planet's extreme flattening had cut down the radiation on the north polar cap very rapidly after midwinter and partly because Mesklin's distance from the sun had increased more than fifty per cent during the same time; Barlennan, when consulted on the matter, proved perfectly willing to start the journey with the astronomical advent of spring, and showed no apparent anxiety about equinoctial gales.

Lackland reported the natives' readiness to the station on the inner moon, and the operation of transferring tank

and sled to the surface was started at once; everything had been in readiness for weeks.

Two trips of the cargo rocket were necessary, light as the sled was and fantastically high the thrust developed by the hydrogen-iron slugs. The sled was brought down first, with the intention of letting the crew of the *Bree* haul it onto the structure while the rocket went back for the tank; but Lackland warned against landing close to the ship, so that the clumsy looking vehicle was left beside the dome until the tractor arrived to tow it over to the shore. Lackland himself drove the tractor, although the crew of the rocket stood by to satisfy their curiosity and, if needed, lend assistance with the loading procedure.

No human help was needed. The Mesklinites, under a mere three Earth gravities, were perfectly capable physically of lifting their ship and walking off with it; and the insuperable mental conditioning that prevented their getting any part of their bodies underneath such a mass did not prevent their towing it easily across the beach with ropes—each crewman, of course, anchored firmly to a tree with one or both sets of rear pincers. The *Bree*, sails furled and centerboards retracted, slid easily across the sand and onto the gleaming platform of metal. Barlennan's winter-long vigilance to keep her from freezing to the beach had proved adequate; also, in the last couple of weeks, the ocean level had started to rise as it had already done farther south. The advancing liquid, which had already necessitated moving the vessel two hundred yards inland, would certainly have melted her free had that been necessary.

The builders of the sledge, on distant Toorey, had provided eyes and cleats in sufficient numbers to allow the sailors to lash the *Bree* firmly in place. The cordage used appeared remarkably thin to Lackland, but the natives showed full confidence in it. They had some justice, the Earthman reflected; it had held their ship on the beach during storms when he himself would not have cared to walk abroad in full armor. After all, if the ropes were made of native plant fibers, they might well be remarkably strong; vegetable tissue might reasonably be expected to be as tough as that of the animal life on this planet. It might, he reflected, be worth while to find out if the cordage and fabric the Mesklinites used could stand Terrestrial temperatures.

This train of thought was interrupted by Barlennan's approach with the report that all was ready on the ship and sledge. The latter was already attached to the tank by its tow cable; the tank itself stocked with sufficient food to last its one-man crew for several days. The plan was to re-supply Lackland by rocket whenever necessary, landing far enough ahead so that

the flying rocket would not cause too much perturbation to the natives on the ship. This was not to be done oftener than strictly necessary; after the first accident, Lackland did not intend to open the tank to the outer air oftener than he could possibly help. A good deal of work had been done on the moon to make the engine compartment of the vehicle more nearly airtight, but Lackland was perfectly aware that hydrogen is a remarkably penetrating substance. On the whole, the more tightly sealed the door of the tank was kept, the better it would be. Lackland could not live in armor the entire time, and if he were to light a cigarette after picking up food and too soon for the air circulators to have done their work the *Bree* would be stranded a long way from an ocean.

"I guess we're ready to go, then, little friend," he said in response to Barlennan's statement. "I won't need sleep for a good many hours yet, and we can get quite a distance upstream in that time. I wish your days were of a decent length; I'm not too happy about driving over a snow field in the dark. I don't think your crew could pull the tank out of a hole, even if they could find the traction."

"I rather doubt it myself, though my ability to judge weight is very uncertain here at the Rim," the captain replied. "I doubt that the risk is very great, however; the snow isn't sticky enough to do a good job of covering a large hole."

"Unless it drifted in to fill it completely. Well, I'll worry about that if and when it happens. All aboard!" He entered the tank, sealed the door, pumped out the Mesklinite atmosphere and released the Earthly air that had been compressed into tanks before opening the door earlier. The small tank that held the algae whose job was to keep the air fresh glimmered as the circulators began driving bubbles through it. A tiny spectrometric "sniffer" reported the hydrogen content of the air to be negligible; once assured of this, Lackland started his main motors without further hesitation, and headed the tank and its unwieldy trailer into the east.

The cove where the ship had spent the winter remained in sight only a short time; they passed its head very quickly. The river of which it was the widened mouth ran too far to the north for them to catch more than occasional glimpses, though Lackland's map indicated that it would curve back enough to force them quite a distance to the south later on. He could have saved actual distance by angling that way from the beginning, but he did not want to go a single mile from the equator any sooner than he had to. He was going to have to experience more than another half gravity before the trip was over, but there was no hurry about that.

The near flatness of the country around the cove changed gradually. In

the forty days or so before Lackland had to stop for sleep, they had covered some fifty miles, and were in an area of rolling hills which reached heights of three or four hundred feet. No trouble had been encountered, either in pulling the sled or in riding it. Barlennan reported on his radio that the crew were enjoying the experience, and that the unusual idleness had not bothered anyone yet. The speed of the tank and its tow was about five miles an hour, which was a good deal faster than the usual Mesklinite crawl; but in the negligible—to them—gravity, some of the crew were going overside and experimenting with other methods of travel. None had actually jumped as yet, but it looked as though Barlennan might have companions before long who shared his newly acquired indifference to falls. He had given up trying to stop such experiments; if his men came to grief later through forgetting where they were, it would be their own fault.

No animal life had been seen so far, but there had been occasional tiny tracks in the snow which apparently belonged to creatures similar to those the *Bree's* crew had hunted for food during the winter. The plant life was distinctly different; in some places the snow was almost hidden by grasslike vegetation that had grown up through it, and on one occasion the crew was held spellbound at the sight of a growth which to Lackland resembled a rather stumpy tree. The Mesklinites had never seen anything grow so far from the ground, and even the Earthman was a little surprised that it had held up under the winter's storms. He would have liked to secure a specimen of its wood, but realized that if he started that sort of thing the trip would never be finished. He consoled himself with the thought that the sled would be coming back with him, and there would be no need for it to make the trip empty. He forgot for the moment that there would be no need for him to come back.

While Lackland slept as comfortably as he could in his cramped quarters, the crew spread out over the surrounding country. They were at least partly motivated by a desire for fresh food, but salable cargo was the goal that really moved them. All were familiar with a wide variety of the plants which produced what Lackland had called spices, but none of these grew anywhere in the neighborhood. There were numerous growths bearing seeds, and nearly all had leaflike appendages of one sort or another and roots; the trouble was that there seemed no way of telling whether these were even safe to eat, to say nothing of being palatable. None of Barlennan's sailors was rash or naive enough to take even a taste of a plant he had never seen; too much of Mesklin's vegetable life protected itself with fearsome efficiency with poisons. The usual means of testing in such cases involved trusting to

the senses of any of several small animals commonly used by the Mesklinites as pets; what a *parsk* or a *ternee* would eat was safe. Unfortunately, the only such animal aboard the *Bree* had not survived the winter—or rather, the equator; it had blown away in the gust of one of the winter storms when its owner failed to lash it down.

The sailors did, indeed, bring numerous hopeful-looking specimens back to the ship; but none of them could offer a practical suggestion as to what to do with his find. Dondragmer alone made what might be termed a successful trip; more imaginative than his fellows, he had thought to look *under* objects, and had indeed turned over a great many stones. He had been a little uneasy at first, but his nervousness had finally worn off completely; and a genuine enthusiasm for the new sport had possessed him. There were lots of things to be found under even quite heavy stones, he discovered; and he presently returned to the ship carrying a number of objects which everyone agreed must be eggs.

Karondrasee took them in charge—no one was afraid of eating any sort of animal food—and presently the opinion was confirmed. They *were* eggs—very good, too. Only after they had been consumed did anyone think of hatching some of them to learn what sort of animal they might belong to; and with that thought voiced, Dondragmer carried it a step further by suggesting that perhaps they might hatch an animal which could serve in the place of the missing *ternee*. This idea was enthusiastically accepted, and parties sallied forth once more to look for eggs. The *Bree* had become practically an incubator by the time Lackland woke up.

The Flyer listened with interest to what had taken place while he slept, and expressed some surprise at finding eggs while the ground was still covered for the most part with snow; but this did not seem to bother the Mesklinites. Lackland did not make a point of it; he realized that it would have been much more surprising if Mesklinite life had resembled that of Earth in any particular respect.

Making sure that all the *Bree's* crew had returned aboard, he restarted the tank, and resumed the eastward journey. The hills grew higher in the next few days, and twice they crossed streams of methane, fortunately so narrow that the sled could actually bridge them. It was well that the rise in the hills was gradual, for there was a little uneasiness among the sailors whenever they had to look down any distance; but that, Barlennan reported, was gradually decreasing.

And then, some twenty days after the start of the second lap of the journey, their minds were taken completely off the terrors of height by something which seized and froze the attention of every living being on both vehicles.

TO BE CONTINUED

SETTLE TO ONE

BY CHARLES DYE AND APRIL SMITH

***Kipling** said, "The more you have seen of the other, the less you can settle to one . . ." If the Ideal is known to exist . . .*

Illustrated by van Dongen

The spaceship—for there could be no doubt of what it was—rested silently in the dust and sun of the New Mexican desert. For several hours heat waves shimmered up its glowing hull, sending skyward miniature breakers of turbulent atmosphere, then the air lock slowly circled open.

Scientists and officials around the immediate area stiffened, fantastic images of alien monstrosities flickering through their minds. A figure emerged from the opening and took a few cautious steps toward them. They became conscious of a sudden sense of relief, of fears melting and dissolving like snow in a hot sun.

The figure was a woman.

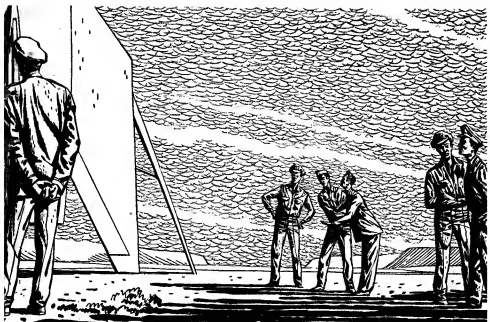
She was so beautiful that they caught their breath. The undercurrents of apprehension that had filled their futile attempts to force an opening in the vessel, the anxious piling up of a circle of weapons, the frantic communications with Washington, had prepared them for anything but this.

The bulky suit that enveloped her tiny figure left only her face visible. They could hardly have told how they knew she was beautiful. But something in the way she walked towards them was arresting in its loveliness; it was a kind of flowing. The slow pause, the direct upward glance sweeping over the sea of faces—these were music out of an old dream. And the tentative, half-shy gesture with which she held out her hand to them was somehow filled with such friendliness that what remained of their tensions and fears vanished into nothingness.

In spite of the power the spaceship behind her represented, it was impossible to look at her and feel fear.

The moment of breathless silence broke, and those in the group hurriedly selected to receive the alien form of life when it should appear, stirred, turned to each other with a few low words, and began to walk forward. Some of them still had a look of being wind-blown and disarrayed; they had arrived at emergency speed from Washington and elsewhere. Mixed with them were important scientists already present at the White Sands proving grounds, near which the strange ship had suddenly descended. All of them, as well as the personnel massed behind the roped-off area within which they stood, were under orders of strictest secrecy.

Kathryn Owens, the one woman in this special group, watched the colonel in charge of the project separate from the others with a pair of his aides and stride forward to greet the alien. She owed her position in the group to her abilities as a linguist, and she followed the colonel a step or two behind. Excited by the nature of her summons, she looked less poised and efficient than usual. Her honey-brown hair which mingled its color with the thick frames of her harlequin glasses was slipping in loose strands out of the bun into which it was gathered at the back of her neck. The clear complexion was unpowdered and shining under the hot sun, and perspiration stained the throat of the T-shirt above the faded dungarees she had not had time to change. Only the blue eyes were cool,



holding a clinical dispassionateness, even though they were mere slits against the shimmering heat reflections radiating outward from the spaceship. The slender beauty of her face and figure contrasted with the slightly masculine, assured walk with which she followed the general.

They were a few steps now from the alien woman. With a sudden gesture, she pulled off her space helmet, and silver hair cascaded to her waist. It was the silver of stars; it sparkled and danced. Looking closely, they saw that her eyes were green, flecked with light. The eyes seemed to look straight into theirs, neither smiling nor sad, giving a sense of how they could soften into tenderness or passion.

For a moment she stood looking at the colonel, neither of them speaking. Kathryn watched them. She had a curious impression that the colonel's stiff, military bearing momentarily softened into an attitude of desire, a longing out of the depths of his being, in which the world was shut out and forgotten. Then he drew in his breath sharply and spoke so brusquely that Kathryn shook her head slightly, feeling she must be hallucinating.

The small alien paused a long moment after the colonel's greeting, then shook her head. A series of meaningless, jumbled sounds issued from her lips in a low musical timbre. Kathryn watched desire struggling to show itself in the colonel's stern eyes, and this time she knew she was not mistaken. Shifting her glance, she let it flicker over the faces of the men around her and those further back in the surrounding area. On not one face could she find the attitude of curious, dispassionate scientific interest in the alien that she herself was feeling. Instead of reacting to her as an alien, they were reacting to her as a woman!

Staring back at the tiny creature who seemed to be turning an assembly of sober scientific men into a group of

adolescents, she saw with amazement the same enraptured look on the woman's own face. She was staring back at the men thronged around her with eagerness, fascination, desire. Her lips were parted and she had a smile of delight on her face.

It was wonderful to see—but not to Kathryn. Suddenly she looked back again, her eyes searching apprehensively through the crowd for the face of her husband, Ron, who was a rocket engineer at the project. He had always been so proud of her — proud of her beauty and her brilliance and her cool charm. She did not want to see that look on his face that the others wore. Finally her searching glance seized on his form. Her eyes dropped, hurt. She felt a slight shiver run through her.

She was roused by the touch of a hand on her shoulder, and looked up to see the colonel motioning her forward with his head, asking her if she could make anything out of the alien's mumbo jumbo.

She shook her head. "We'd better stick to sign language and try to establish a few common words between us."

The colonel nodded.

Stepping out in front of the others, she began an interchange of gestures which she had used many times over in her initial efforts to establish communication with primitive peoples in obscure parts of the world, preparatory to learning their language and studying its structure. With bright, attentive eyes, the alien woman watched every movement closely, comprehending their meaning with amazing rapidity, and giving clear-cut, careful, and ingenious movements in return. They were filed away in that part of Kathryn's mind which stored data to improve her techniques; she knew that had she met with such responses elsewhere she would have labeled them genius. From time to time Kathryn turned to the colonel, indicating the information that was being exchanged.

"She is friendly . . . she would like to stay and learn our language so that we can exchange information and the knowledge our cultures possess . . . she is grateful to have landed in a place where the people are so . . . pleasant." Kathryn paused to wipe her brow, smoothing back a few loose strands of hair into the soft bun at the back of her neck. "She doesn't seem to have been aiming for our planet, colonel. Apparently she didn't even know there was life here."

The colonel followed her gesture, wiping off sweat with a large handkerchief. "Nothing to worry us so far, then. Try to find out where she comes from."

The gestures continued. "She comes from . . . another star system, I think . . . yes, not our solar system . . . and has been traveling a very long time — I can't make out the time measurement she's using." The in-

formation began to come through more rapidly, as the signs and gestures became less tentative. "This is the first venture of her people out of her star system . . . they've recently perfected a new type space-drive . . . evidently it's one of a group of eleven new ships sent out in the hope of contacting other life-cultures and establishing contact. She says two other intelligent life-forms have been found, but at a low and primitive level . . . and that they had no expectation of finding any form of life so similar to their own . . . we look just like her people, except for coloring and height . . . does not understand how this can be."

Kathryn paused again, tucking her shirt more firmly into the faded dungarees. She had a sudden sense of the strangeness of the picture she and the alien must make—two women, gesturing with strange motions, circled by a crowd of men watching in intent silence. She suddenly realized that they had been there a long time, and that her body ached from standing in the heat and dust. She searched the evenly-poised body of the alien for signs of weariness, and saw it slump into a picture of exhaustion as the woman comprehended the reason for the look. Kathryn turned to the colonel. "I think she's very tired . . . she's had a long journey." There were a few more gestures. "One more question and she would like to rest . . . she wonders why there are so many . . . so many men on this planet."

One of the scientists broke in at this point. "You might explain that the sexes are distributed evenly in the normal population. And ask her why they sent only a woman on such an important mission as this?"

Kathryn frowned. "She doesn't seem to understand the question—"

She was interrupted by one of the colonel's aides: "We've been standing here two-and-a-half hours. We'd better see what she wants to do, and about arranging a place for her to stay— Wait a minute!"

A conference followed in low tones, and the aide turned back to Kathryn. "We think, if you would be willing to do so, it would be a good idea to ask her to stay with you and your husband. We'd like to keep her here on the project for the time being. You are the person most able to establish contact with her and to help her learn our language. We know it involves some risk, but the place will be well guarded; and she certainly doesn't seem to be dangerous."

Kathryn hesitated imperceptibly, the remembrance of Ron's earlier look flashing through her mind, feeling there was more than one way to be dangerous. Then she turned, pushing her doubts out of her mind. "Of course. This should be a wonderful experience."

Kathryn watched Melandra lying on one arm on the bed untwine a rose

from among the soft shimmering silver waves of her hair. Someone had tagged her with the name Melandra because it sounded most like her own, which was unpronounceable. They were in the guest room which had been turned over to her, relaxing after the big evening. Kathryn's intensive work training Melandra to speak English was completed and tonight's banquet, three weeks after the arrival, had celebrated their achievement. Melandra now spoke well enough for the work of exchanging scientific information with top scientists in various fields to begin. The rapidity of their progress still left Kathryn amazed, even though she realized it was in part due to special recording and analyzing instruments carried in the spaceship.

She fought off a feeling of envy for the hundredth time that evening. Kathryn had known admiration and compliments—but no such wordless longing as she saw men struggling with as they watched the changing features of Melandra. She shook her head as she remembered — remembering, too, the dim resentment and hatred that had struggled with her affection for the alien and her clinically objective evaluation of the situation.

She liked Melandra. She could not help it, even when she wanted not to like her. Used to the smallness, the cold and reserved relations of most women of her society to each other, she could not help contrasting the frankness of Melandra to their hypocrisy.

With a sudden strong effort Kathryn pushed back the gnawing feelings of envy. Such feelings were unworthy of her. She leaned forward in her chair, continuing her conversation with Melandra. "But I still don't understand why they sent a woman on such an important mission. Wouldn't a man be stronger, have a better chance of survival?"

Melandra's reply raised an inexplicable wave of uneasiness in her. "But I have mentioned there are fewer men than women on my planet. In fact, there are four or five women to every man. Any woman who has a . . . what you call a 'husband' . . . like I had for a while, is considered very lucky."

"Four or five." Kathryn was thoughtful. "I hadn't realized there was that kind of discrepancy. Your whole society must be organized more differently than I had thought." She contemplated Melandra's beauty. "I don't wonder you had a husband!"

The green eyes opened wide. "But I was lucky."

Some vague alarm filtered through Kathryn's mind and was thrust back impatiently. "How did it come about —this shortage of men, I mean?"

Melandra sighed, fingering the black nightgown Kathryn had made her a present of. "It was a . . . a piece of great stupidity. There was a . . . what you would call experiment . . . an installation all over the planet of a new lighting system using . . . well

. . . I won't go into it, a sort of nuclear radiation, only different from the type you are working with. They had tested it for explosive potential, of course, but no one thought to test it for the effects of prolonged exposure on reproductive . . . on genes. That was three generations ago. After a while they connected the absence of males among the newborn with this lighting but by then tremendous damage had been done. It wasn't complete, and we have had some success with research in new substances to nullify these effects, which are unfortunately hereditary. The birth rate is slowly rising again. But it is a slow rise. It has been very tragic." She sighed again. "It has required quite an adjustment — even on those of us born into the new conditions. Men are very important to a woman."

"Yes. Men are very important to a woman," Kathryn assented. The fuzzy feeling of apprehension at the back of her mind was growing. She suddenly wanted to change the subject. "It's very late. I think Ron should be home soon. If he works on those equations he took over to the lab very much longer, he'll be so sleepy he'll start making mistakes. And I'm pretty tired myself."

The sensation of alarm became poignant for a moment as Melandra nodded sleepily and stretched, slowly and sensuously, her eyes half-lidded, her silver hair rippling through her fingers at the back of her neck.

"I don't believe it." Kathryn stared at the strand of silver hair in her hand, as she whispered the words to herself. She stared down at Ron's bed where she had found it. "I won't believe it."

"Something the matter, darling?" She looked up to see her husband in the doorway.

Mutely she showed him the strand of silver. He started, then laughed lightly. "Oh! I was going to talk to you about that. I guess this is the time to do it." He sat down on the bed, lounging back on one elbow. "Sit down, Kathryn," he added, seeing she made no move.

She sat down stiffly on a chair beside him, her body tense.

"I came home from the laboratory very late last night, and didn't want to disturb you, so I went straight to my room. Just as I was going in, Melandra came up to me and said she wanted to talk to me. I told her to come on in, and we sat, like you and I are now, and talked a while. That's all."

Kathryn lit a cigarette carefully, and leaned back. "What did you talk about?"

He paused, a puzzled frown wrinkling his forehead slightly. "It's strange. She seemed to be trying to find an answer to some question, but she didn't ask the question. I think she would have—she's very direct—but in the middle of it all she got up and said she would have to talk to you. And then she said good night, and left."

Kathryn held her voice low. "I wonder if the question had anything to do with being in your bedroom after midnight."

"I don't think she realized any implications in that. After all, she's from a totally different culture." Ron hesitated. "It . . . it's strange—" He seemed unwilling to go on.

Kathryn leaned forward, her tension increasing. "Tell me about it, Ron. Please."

He nodded. "Well, it's just that . . . I can hardly remember what we said in the beginning. But, as I talked to her . . . she kept smiling at me, as though she were in a sort of dream, nodding at what I said as though she were hardly listening—as though she were only responding to some bright warm feeling sweeping through the inside of her, and over to me. It was as though a warm cloud were wrapping us in together. I got the strangest feeling . . . the stars outside the window and the line of trees in the moonlight seemed so beautiful it made my heart ache. I began to get frightened inside. I told her she was attractive, *too* attractive—"

Kathryn's harsh tone belied her hurt eyes. "I imagine that was a little too subtle for her."

He swallowed. "She just thanked me." He paused. "I didn't mean to go into all this, but since I've started, I might as well tell the whole thing. I said she knew I had a wife. I spoke roughly, because something seemed to be happening to me I couldn't control." His eyes stared into Kathryn's, searching for some understanding. "Look, you know I love you. I've always loved you and been proud of you. But there's something about her—" He shook his head, confused. "Kathryn, I . . . it was all right this time, but—I can't promise for the future. I can't. I don't want anything to happen, but . . . I felt as though I had been waiting for those moments with her all my life . . . and for the moments that didn't come. It was as though she were something I had dreamed in a dream long ago and forgotten, and longed for for years without knowing it, as though she were a goddess, an unattainable goddess suddenly within reach of my arms. She seemed to fulfill all the wild, restless longing I've felt on still nights when the sky and the moon and the whispers of sound reached out and enveloped me in some nameless yearning. She's what music is, she's—"

He broke off for a moment, and stared unseeingly through the window. "It's not that she's so beautiful . . . it's the way she moves, I think. And that soft voice blending in with her gestures. Something about the way she moved — it seemed to catch the rhythm of my blood and do strange things to it. I suddenly couldn't think at all. I felt like a tree stripped of its leaves by a high wind. I'm turning into a poet, but no words are like what I felt. Compared to it, everything I've

felt before — it's like listening to amateur fiddling all your life and suddenly hearing Heifetz—"

He stopped short, as Kathryn made a low, strangled sob. "What an awful thing for me to say!" He looked at her in dismay and put his head in his hands.

After a moment he went on desperately, "Anyway, that's all beside the point. She was talking about her people and ours, and about how the doctors have found she is constructed anatomically the same as we are except for being smaller—her planet is smaller —so interfusion of her race and ours will be possible. She seemed to be driving at something, but I still don't know what it was. We were talking about differences in marriage customs there and here, and all of a sudden she got up and made that remark about

having to talk to you, and left. So I'm still in the dark. I'm waiting to find out what she said to you."

Kathryn stood up quietly. "She hasn't talked to me yet. I think I'll go find her now." She turned and walked to the door, pausing with her hand on the doorknob. "I understand about what you told me. I wish I didn't, but I do." There was a faint click as the door closed behind her.

Once outside, her control broke. She leaned against the door, letting tears stream from her eyes, her body quivering. She stood there a long time. When the tears stopped, she wiped her eyes carefully and walked to Melandra's room.

Melandra was leaning on her elbows, looking out of the window at the sunlit desert sky.

"Ron tells me there's something you want to talk to me about." Kathryn tried to keep the acid out of her voice.

The girl turned eagerly. "Yes. I was going to find out how your husband felt about it, but then I realized I must ask you first. You see, your customs are so very different here. It is so confusing, so easy to do the wrong thing."

Kathryn nodded. She felt some of the tight, held-in anger in her begin to dissolve as she looked into Melandra's soft, direct glance. Then she remembered the longing, faraway look in Ron's eyes and felt a wild fury rising within her. "I'm sure that's true. But I think some things are the same everywhere. And I wish you would please stay out of my husband's bedroom, and I wish you would remember that he's *my husband!*"

"Why . . . you're angry, aren't you?" Melandra looked up, startled. "You're very angry."

Staring back at the guileless, green eyes, Kathryn felt her anger ebbing from her. Suddenly she felt very tired. "You told me you had a husband on your home planet. How would you feel if . . . say, if he made love to another woman?"

The green eyes opened questioningly. "But he did, of course. Very many. He . . . he stayed with me, in my house — but naturally, I didn't have him all to myself. Even if he had wanted it that way . . . I would never have been so selfish. There are not many men—"

Kathryn sighed. "I guess we are involved in one of those things they call a 'cultural misunderstanding.' I never realized they were so tough on the participants—some of them, anyway. Melandra, what did you want from my husband?"

The answer was soft. Melandra looked deeply into her eyes, and for a moment Kathryn seemed to catch a vision of an infinite depth of green forests and green pools melting into each other a million million miles distant. Then she heard her answer. "I wanted a child."

Melandra went on eagerly. "If I could carry back in me even one child without the defective germ plasm of my race, it should spread and spread in my children and my children's children. The strain would survive because of its strength." She went on, more quietly. "I was going to ask your husband to give me a child. But as I talked to him, I realized that it was not correct. Things are different here than in my home. When you marry here, you seem to acquire exclusive ownership over each other. I do not understand very well, but I realized I must come and talk to you. He seemed, somehow, very confused and troubled."

"Oh!" Kathryn sat still for a long moment, her anger quite gone, replaced by a mixture of emotions. The strongest of these was a helpless distaste for the role she was going to play. To a situation new to all history she was reacting in a rigid, antique pattern, with nothing in it for which she could admire herself. She delayed her refusal. "Why did you choose my husband? Are you in love with him?"

"In love?" Melandra seemed to taste the words. "I still have trouble with some words. I could never quite understand what that one means to you—will you explain again, please?"

"It means . . . just tell me how you feel about my husband."

The rapturous smile was there again. "He is wonderful. For a time . . . he seemed strange, like all of you. Very much . . . big—you know, our men are only a couple of inches taller than I am. He seemed sort of . . . what word do I wish? If frightening can be a pleasant word, I mean that . . . and he is very handsome, very attractive . . . that black hair and those deep brown eyes, that sort of—rugged? rough?—are these the right words?—that quality. And then he is brilliant." She paused. "And he is kind . . . he is excellent stock for our race. I would like him to be the father of my child."

Carefully Kathryn began to explain to Melandra that she must refuse, to put into admirable words the justification by herself and society of possessiveness. The words came out in high-sounding terms, but inside herself she felt small.

But Melandra only nodded, accepting the refusal without question, without resentment.

Then a question flashed across Kathryn's mind that she realized had been tugging at it for days. "Are all the women on your home planet as beautiful as you are?"

She did not expect Melandra's laugh. "I'm not beautiful. Oh, I'm considered all right at home, but—" She laughed again, happily. "Nobody at home reacts to me like the men do here. I've noticed it. I'm not too anxious to go home."

Kathryn knew as they talked on about things that touched them less closely that Melandra would never

attempt to approach Ron again, now that she understood the situation. But somehow it did not reassure her completely. She still felt a gnawing anxiety inside her, a confused sense of danger.

"Baby!"

Kathryn found herself caught up and swirled around the room.

"The things that little brain knows! She's advancing science at the rate of a decade a day! Kathryn, do you realize she's giving us the knowledge not only to transform most of our major industries, but to build a spaceship—not a spaceship that will get us to the Moon or the planets, but one that will get us to the other stars! In fact we're working out an arrangement now by which we can send a whole colony of men to her planet and bring back an equal number of her people here to study each other's cultures. Her people have had to use ships that would hold only one person, but we have materials here that will change that! By fusing the science of our two planets, we'll be able to explore whole galaxies."

Suddenly a new meaning his words might hold entered her mind, and her body began to go cold all over. "Ron, you . . . you're not going with that first group?"

He was quiet now, and his voice was soft. "Darling, you know they'll need me . . . I didn't mean to break the news so abruptly."

She held herself stiffly, trying to absorb the shock. Then her control cracked and a long sob welled up in her throat.

"Kathryn, don't take it so hard. It won't be as long as you think. And it's safe—unbelievably safe. Not as if we were launching our own first spaceship at all. It's sort of like taking a jet to New York now, as compared to trying to fly the first plane."

Kathryn clung to him, her face buried in his shoulder, pulling herself together. She wasn't going to tell him about the cold, gray fear in the back of her mind, the shameful selfish fear that had nothing to do with his safety, the fear of a planet full of Cleopatras without men of their own.

Kathryn still lived with Melandra as the scientific meetings went on. She talked with her, ate with her, liked her. She responded to the open, candid, friendly manner. With her swift change of moods, Melandra was exciting and stimulating to live with. Kathryn felt herself dragged out of some of her own calm poised sameness and realized that she had been a little emotionally flat and ungiving. And in Melandra she found joy and laughter and mischievousness and sadness and anger and indignation—but the relaxed eyes and soft mouth never held hypocrisy or revengefulness nor pettiness. Kathryn had known a lot of women. She knew a nice person when she saw one — even if she was from a

strange foreign land beyond the stars.

But as the days passed, something in the back of her mind kept pushing forward. It took her a long time to recognize it for what it was. It was hate. The dull, ashes-in-the-mouth hate that knows itself unjustified—the bitter, confused, self-torturing hate that only envies its object and cannot despise nor even dislike it objectively. Occasionally she would stop hating for a moment and try to rationalize it, to try to see Melandra at fault. Then her long training in scientific objectivity took over.

She forced honesty out of herself. She forced the rational, the dispassionate, the fair outlook. She forced a fair evaluation from that part of the heart and mind that is above what is petty even though the whole being is racked with tortured resentment and pushes to put the simple deed into ugly words. *What can she do*, she thought, *being what she is? Can she try to be less?*

If beauty scatters discord and envy and hate and confusion as it walks, can we say, "Let it be ugly that men may not lie and cheat to have it, that they may be contented with their dull and nagging, tired-eyed wives?" Is beauty to blame that one vision of it causes addiction? Was Helen to blame for Troy?

The spaceship plans had been completed.

One night Kathryn found herself walking alone to where the celebration was to be held. Melandra, the guest of honor, was already there—as was Ron who was sharing second billing with several other engineers and scientists.

Just as she was entering the project grounds, she ran into Lila. She had never liked Lila very well. She thought her something of a nag and didn't wonder her husband was known to have an interest in other women. Today, however, Kathryn felt an unfamiliar sense of closeness to Lila.

"Kathryn!" Lila grabbed her arm. "I haven't seen you for ages—not since that silver-haired dame got here. Oh, but I've seen *her!* And all of them, our husbands, sitting there at those meetings with their tongues hanging out, trying to pretend they're only thinking of science. I wish her spaceship had landed in the middle of the ocean!"

Kathryn was ashamed at the feeling of pleasure she could not repress at Lila's words. She hastened to contradict her feeling of sympathy at seeing her own unacknowledged feelings on the other woman's face. "Lila, she's not like that. She's nice. She doesn't know—that is, she knows, but she doesn't mean . . . I mean things are different where she comes from. It's—she can't help being lovely."

There was a long silent pause.

Then the pent-up violence in Lila's voice sounded even nearer to the explosion point. "I suppose you've heard by now about the expedition. I just got this nice, cheering piece of news

myself. Herbert, it seems, is going along. Tells me it's all fine and safe. He's very enthusiastic. Yeah! What it means is that this whole planet is going to be deluged with those silver-haired, man-hungry dames who have no ethics. As soon as they find we have this paradise of Adams over here, they'll be here in armadas—or else all the men will be over there! We have about as much chance against those women as a mouse against an elephant. They've evidently got twice the brains we have—to give her her due—and apparently they concentrate nine-tenths of their brain-power on one problem—how to get a man. Cleopatra would look like a raw ingénue compared to those babies." Her tone was bitter. "You know what it's going to mean, all right. This 'cultural problem' of no men that they've been struggling with is going to be solved for them, sure—with *our* men. Then we'll have *their* problem! I hate her."

"Lila! Get hold of yourself—you're beginning to frighten me." She shook Lila's arm slightly. "Look, here we are."

Inside the celebration hall they each were handed a cocktail, and Kathryn watched Lila disappear into the crowd. Then her cool, blue eyes surveyed the people milling around Melandra, the women on the outskirts, the little side conversations. She knew she looked poised and calm in her soft, low-shouldered brown dress. She knew that years of pride, of keeping her own counsel, made her able to make her face a successful reposed mask that hid the sickness she felt inside, the hurt at watching Ron watching Melandra.

She also thought of the other women, and of Lila's hysterical outburst of hate. Turning around to look for her, she was just in time to see Lila leaving the powder room at the far end of the hall. She stared at Lila startled. All control was gone. Her face was distorted with rage. Her thick body shoved through the other guests past Kathryn and on into Melandra's presence.

"You hypocrite! I could put up with that faraway look in my husband's eyes every time he'd been near you—that slight frown with which he shoved *me* away as an unpleasant reality that he didn't want interfering with his dreams. I've been putting up with it a long time; as long as it remained a dream. But I heard about last night just now! Someone saw you together —" The voice had climbed to a high screech of tortured rage.

Everyone stood in a kind of shocked silence, watching her, as Lila suddenly drew back and slapped Melandra's face with tremendous force, so that her body rocked. In another minute Lila was clawing and biting at her like an animal suddenly gone mad. The stunned silence changed into a pandemonium as men swamped her, pulling her roughly away from the alien.

Melandra stood there with the men holding back the still frantic enraged Lila, blood springing from red welts on her cheek. She said nothing for a long time, staring bewildered, as if she suddenly felt herself really alone, totally alone among people utterly alien and strange whom she could not understand and who could not understand her. Watching her, Kathryn realized it was the first time she had seen a look of complete confusion on her face. Slowly, tears began to trickle from the eyes and stream down, mixing with the blood on the cheeks, and then her whole body began to shake with sobs. She stood there, sobbing quietly, making no move to sit down or to hide her crying. She felt no shame at her tears and sought no reassurance.

Kathryn continued to stare at her, not moving, feeling a kaleidoscope of emotions. She could not go to Melandra and comfort her. In spirit Kathryn was with Lila—selfish, bitter Lila whom she had always despised.

With a sudden burst of clarity she saw her as infinitely more tender, loving, simple and honest than any human being she had ever known—and with a dreadful unescapable insight she knew that it was her own pettiness and greed that united her with the people watching, that everything in her noble and good and sensitive pushed her toward the gesture of quiet affection she could not make.

Kathryn watched the crumpled figure on the guest-room bed. It was the first time she had felt in Melandra a need for reassurance. She was face to face now with the conflict that had raged in her own mind while throngs of people gathered around Melandra and tried to calm her, that had continued as she sat beside her in the car going home.

Melandra raised tear-stained eyes to her, eyes direct and steady, but with a new diffidence. They held doubt, doubt as to what Kathryn's feeling towards her really was. "I don't understand," she said brokenly. "I thought you all liked me. I . . . it wasn't just Lila. I felt the same thing in all the other women—like there was hate streaming towards me from all of them . . . even you—"

Kathryn lowered her eyes, wishing she could shake her head, deny it.

"I've felt it before, but I thought I was mistaken—I thought it was me. But tonight—it was so horrible, all that hate. And even in the men . . . it was almost as though they felt ashamed. Tell me what's the matter."

Kathryn looked at her silently, hesitating. Then she made the plunge. "Yes, they hated you. Lila hates you. They all hate you. And I, too. I hate you." She paused before the hurt in Melandra's eyes. "You won't understand that. You're remembering the times I've said I liked you. Once I said you were nicer than any woman I'd ever known." She paused, feeling an odd warmth steal through her at the

sight of the sudden gratitude in Melandra's wide hurt eyes. "I've tried to deny it a thousand times; I've searched frantically for faults in you, tried to misinterpret the things you did. Maybe I've had too much scientific training—too much training to make a special note of facts you don't want to find. I haven't been able to justify myself — I've had to hate myself as well as you."

She stood up and began pacing up and down the small room as she talked. "Have you ever competed for something you wanted very much and failed? Or worse, not competed because you knew you had to fail? There are very few men on your planet; all any of you there can have is a little portion of a man's love. It's like running in a race with twenty second-prizes and no first prize. Well, here there's only one prize, the first prize."

Kathryn sat down on the bed. "Lila was wrong. No matter how badly she scratched you up"—Kathryn eyed the still livid red welts on Melandra's soft cheek—"she still couldn't have kept you from being beautiful. You're stardust. You're the dreams men dream and never hope to find."

Melandra looked less pathetic now, but her eyes still looked puzzled. "You hate me because I am beautiful?"

Kathryn looked at her steadily. "We hate you because you are beautiful. We hate you for the same reason every woman is glad when the town belle doesn't show up at a dance. We hate you because you are what we can never be, and you're too close for the comparison to be comfortable."

A look of growing comprehension filled Melandra's eyes as Kathryn continued: "You don't know what it's like to be on the other side of the fence. I used to be considered the most beautiful woman around here. Now I know how the drab ones feel. I know the gnawing inside, the feeling of being dull and ordinary, the wretchedness of saying stupid things and moving awkwardly because I'm overanxious. I know envy. It makes me ashamed inside to remember how superior I used to feel." She paused. "But this is all no reflection on you. I don't think you even think of comparisons."

Her tone changed suddenly. "There's only one of you now. What's going to happen when whole colonies of women like you begin coming over here—and when our men begin going over there in droves? This is the only thing I've found to justify my hating you, a little—thinking what this is going to do to Earth, of the marriages it will break up, the unhappy women, the conscience stricken men, the misery."

Again she paused, hoping some of the sharpness would go out of her voice. "And it wouldn't be so bad if you were all just beautiful and nice. After all, our men are tied to us by common feelings and experiences. But you're so incredibly brilliant. Judging by what you've said and what I've seen of you, you're all geniuses by our standards, though you tone it down so no one has any sense of inferiority around you. You turn conversation into something stimulating and fascinating, full of little shocks and surprises and delightful twists. And everyone finds himself suddenly talking brilliantly, everything is comprehended, vague concepts and dreams and ideas he's never been able to visualize or verbalize before. We just don't stand a chance against you, all along the line."

Her tone became earnest suddenly. "Melandra, you've been through three generations of adjusting to a situation with very few men. The first generation must have suffered horribly, but by now you've worked out cultural patterns and compensations. Your mores have changed. You don't have to suffer qualms of conscience or social ostracism for trying to attract every man you meet. You don't have to suffer agonies of hurt pride when somebody takes your man away. But what about us? If it gets easy enough to go between our planets, you're going to have an awful lot of Earthmen around. And we're going to have to go through what your people went through three generations ago. To a woman there's very little of importance compared to love—I say this even though I am a

scientist and fascinated by my profession. I know that if I lost Ron my work that I care about so much now and am so proud of would become empty and meaningless."

Melandra raised her head; the loneliness in her steady eyes was mixed with a strange calmness. Her voice was very quiet, very tired, but there was no confusion in it now. "Thank you for telling me, Kathryn. But I'm worn out for now. I think we should go to bed."

Kathryn stood at the door hesitating, hoping that she had said everything right. She felt a sudden strong need for reassurance.

Melandra smiled, very gently. "I am very fond of you. Good night, Kathryn."

The spaceship was gone.

Where it had been was only a great gaping area of jet-blasted, blackened sand.

Melandra was gone.

Kathryn stared at the crater in the desert, feeling the morning wind on her shoulders, the wind that even now was beginning to pour a fine silt over the place where the ship had been, the wind that was beginning slowly to wipe out the traces of the tremendous thing that had happened to mankind. She lowered her eyes and stared at the little spool of tape in her hand that was all that was left of Melandra—the spool of tape Melandra must have prepared on their wire recorder during the night. Kathryn had found it on the smooth, unslept-in bed when she went into Melandra's room this morning.

Quietly she held it out to the colonel. "This is all that was left. My husband tells me that the plans for the ship to reach her star system, the equations, the maps, everything—all gone, with her and the ship."

The colonel nodded. His face was tired. A strange feeling of anticlimax held the little group who stood there in the bleak early morning light, the white sands stretching dully away all around them.

One of the aides spoke. "We'd better go to Communications and play it on the recorder." His voice brightened. "Perhaps some emergency came up, something we don't know about. Perhaps she'll be back or . . . well, let's not stand around talking about it. Let's find out what's on that tape . . . maybe it's not over. Maybe we haven't lost the stars." The blue eyes behind the glasses in his plain, middle-aged face held a boyish longing.

With one accord, they turned towards the command car. Kathryn watched their tense faces, not sure what she herself felt, what she hoped. The momentary tiredness was leaving all of them, and the air in the car began to thicken with mounting excitement.

As Kathryn stood in the front of the crowd gathered from the area around

Communications into the room holding the tape recorder, her memory flashed back to the larger crowd standing months before around the newly-landed spaceship. The moment of hushed silence as the spool was adjusted into the recorder brought back the tense moment when the air lock had started to circle open. She remembered fear—bracing herself for the sight of horror and instead seeing beauty. How could she have thought as she stood there facing the possibility of tyranny and terror, that in the beauty itself which blew away their fear like a soft sea wind she would later see disaster? And was she right?

Then all thoughts were driven out of her mind by the musical intimate voice of the absent alien girl coming out of the recorder, speaking as though to each person alone. It began simply:

"Men and women of Earth, I am leaving you. By the time you hear this, I and my ship will be gone forever. All the plans for a spaceship that would enable you to reach and find the distant star my planet circles will be gone also.

"I leave in your possession and in the notes of your scientists sufficient knowledge to transform your technology. You will find that you have sufficient information to construct a spaceship that will take you to the planets of your solar system, but travel to the stars will not yet be yours.

"I have done this because I came to realize last night that I have created a problem—a problem that I can solve only by leaving you.

"It seems to be the history of races and cultures that when two which are very dissimilar come together one or both of them must suffer. Our peoples could not come together without spreading unhappiness among you. Your marriage-system would have been disrupted and destroyed, your women made full of hate and misery, your men tortured with confusion. And there is no happiness where there is not happiness in love. I should have seen what would happen long before.

"I came to understand last night what I have already done to the happiness of the people here towards whom I wished only good. Our race is older than yours, more advanced in technology; our intelligence is quick and highly-trained. But in our relations with each other, we are very simple. When we anger or displease one another we always know immediately; we do not give each other smiles and courtesy and then explode with pent-up hate. We lack the subtlety to deal wisely with the customs and ways of thinking of a people as different from us as you.

"And it is possible that the hidden violence in your nature which explodes periodically in organized war would somehow infect our planet with misery. So perhaps, we, too, profit from my sacrifice. For it is a sacrifice.

I have much love for the people of Earth.

"Good-by. I wish your race happiness forever."

The whirl of the recorder stopped.

Kathryn looked out of the window of the room which had housed Melandra, looked out at the line of scraggly trees against the sand, at the soft rolling dunes and the blue sky. Her problem—the problem that would have belonged to the women of Earth—was solved.

Half-knowingly, half-unknowingly she had swerved the destiny of the human race.

Again she saw Melandra's face glancing up from the now-empty bed, and the serene, affectionate smile of a being who knew how to be happy. She was stardust. She was what one unconsciously longs to be. She was what one reached for when one reached for the stars.

How many people had she known in her life who knew how to be happy? Who could tell what secret ingredient of happiness was lost to mankind with the lost spaceship?

Then she heard the door handle click and push open. She looked up at the figure filling the doorway. Her doubts vanished, became an abstract thing she could not feel.

She was safe. She wouldn't lose him.

And then with sinking heart she saw the look in his eyes, a look of longing and desire, the faraway look that showed that his inner self was off somewhere else, somewhere among the stars, the look which had been growing in intensity ever since Melandra's arrival.

With a wild, despairing certainty Kathryn suddenly realized that she had lost him after all. He had seen a dream, and he would never be the same again, never be completely hers again. He had seen a star, and he was lost to Earth.

THE END

FOOD FOR THOUGHT?

Communist philosophy: "A man has a right to what he produces."
Basic law of biology: "No organism can live in a medium of its own products."
Conclusion: Communism may be a good idea, but it won't work.

NATURE DIDN'T MAKE IT

Standard Oil Co. (N. J.)

In the course of evolving life forms, Nature solved some tough problems in some ingenious ways, with some remarkable materials. Men have relatively recently developed materials made of various fiber materials impregnated with plastics—glass-fiber impregnated with phenolic plastic, for example. Trees developed cellulose fiber impregnated with lignin plastic several million years ago. Known as "wood", this plastic impregnate material proves an excellent structural material, synthesized from air, water, and sunlight.

But there are some problems Nature never got around to. So while Nature did fine on designing a material suitable for thermal insulation of mammalian bodies —she never tackled the problem of insulating an electric furnace at 2000°F.

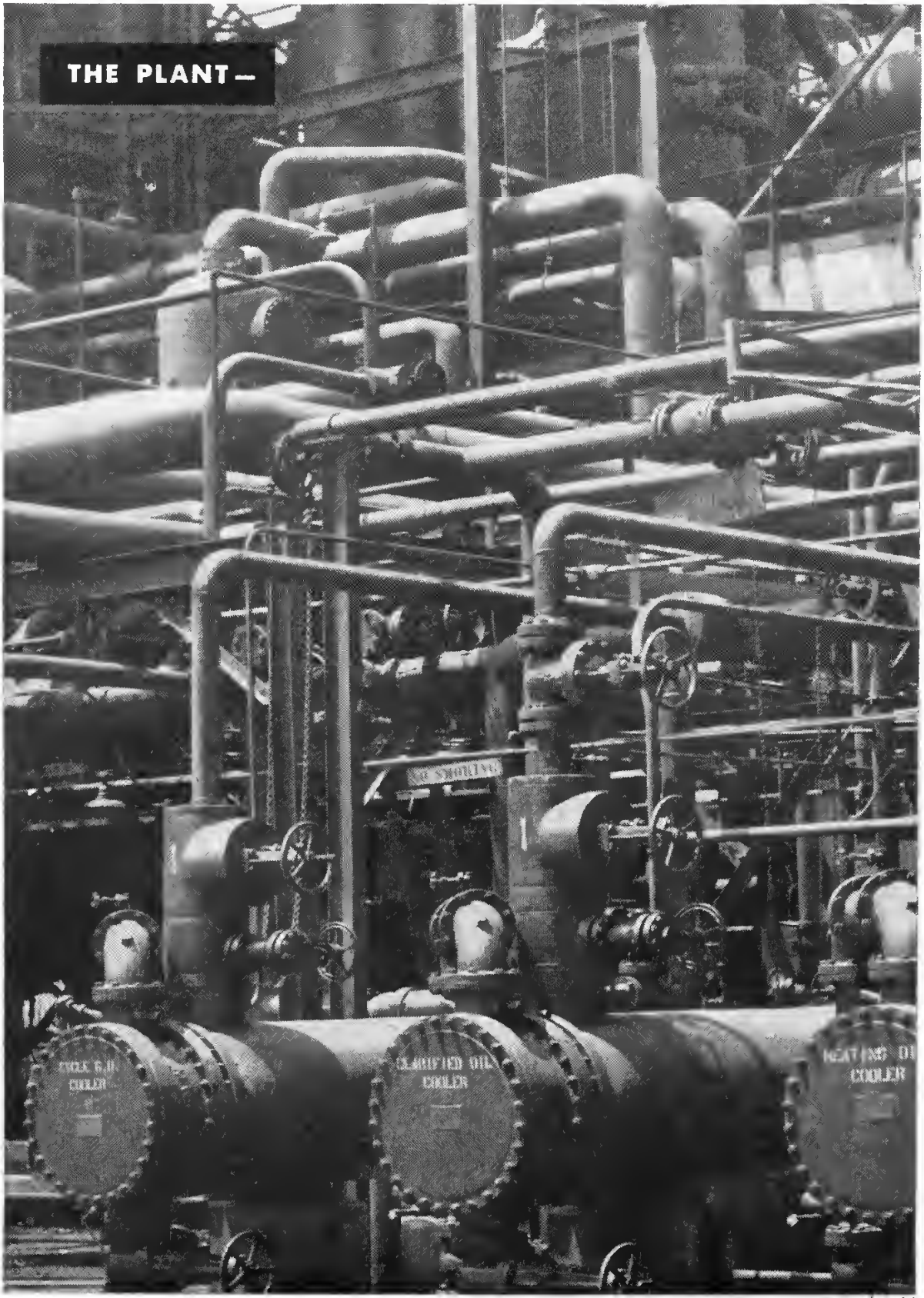
Nature did fine at developing lubricants for animal bones—but never bothered with lubricants for joints operating at one hundred degrees below zero!

Many plant seeds have coatings specially designed to resist the digestive actions of the stomachs of birds who have stomachs specially designed to digest seeds. (Nature's left hand sometimes gets tangled up in her right-hand's doings.) But Nature never tried to get a coating that would resist raw, elemental fluorine.

The early synthetics were designed as substitutes for natural products. But when Nature didn't make what is needed—then a synthetic isn't a substitute, or merely an improvement. It's a new solution to a new problem!

Standard Oil Co. (N. J.)

Standard Oil Co. (N. J.)



Standard Oil Co. (N. J.)

The Seed—

For the modern rubber tree, or any other un-natural product, is planted in glass and frothing liquids. Warmed by the heat of a Bunsen burner, or an infrared lamp, or an electric furnace, it grows.

The Seedling—

Is sometimes hard to handle, and the farmer can't afford too intimate contact with its burgeoning growths.

The Plant—

The full-grown plant has many branches, and unlike the plants Nature uses, produces many strange fruits from a single tree. Gasoline and polyethylene, complex molecules and simple—and the many-fruited plant grows so huge a single plant may cover thousands of acres of ground.

Chemical Division, GENERAL ELECTRIC COMPANY, Pittsfield, Mass.

Silicone—

Nature did make rubber—but not out of glass! General Electric Company makes silicone rubber, based on linked silicon dioxide instead of carbon-carbon linkages of Nature's specialties. GE's silicone rubber bounces, stretches—acts like rubber in being elastic. But it won't turn brittle-hard in dry-ice temperatures and shatter at a touch; after all, Nature invented rubber to heal the wounds of the

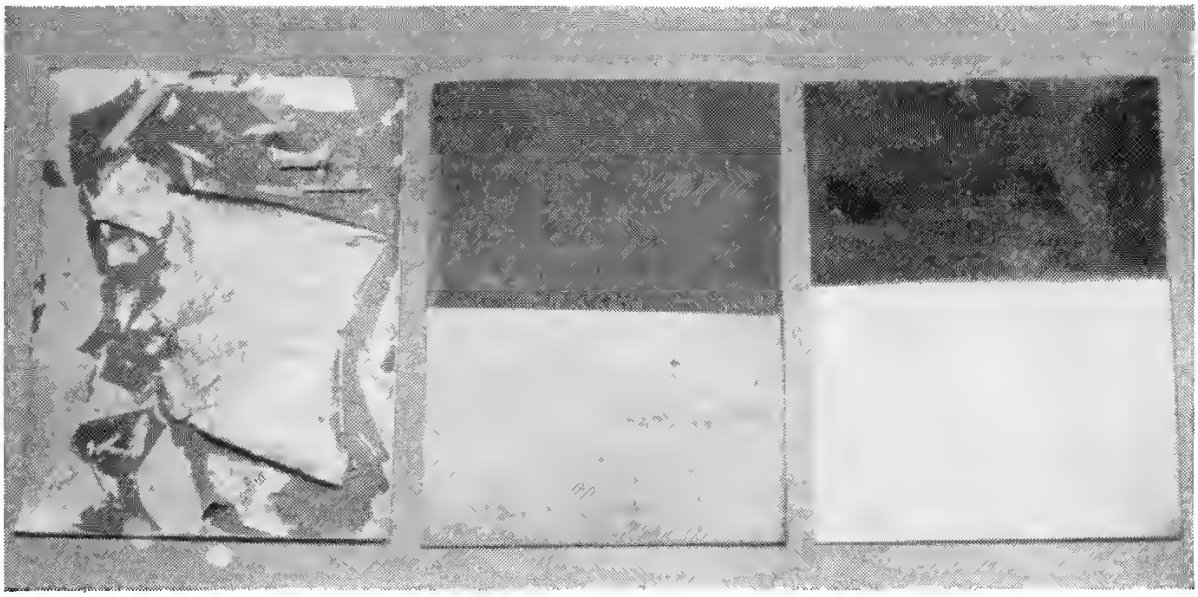
Chemical Division, GENERAL ELECTRIC COMPANY, Pittsfield, Mass.

havea tree—not for machine parts in Antarctico.

Silicone rubber, too, remains useful for long periods when exposed to the ultroviolet light of the sun, ozone of electricol equipment, ond high temperotures. Not being bosed on a carbon-corbon bond, hoving oxygen olreody built into it, a silicone compound is not as subject to oxidative ottock.

Above, silicone rubber cemented to steel can be mode to hold so firmly the rubber breaks in the tensile testing machine before the bond.

Left, silicane rubber insulated cable has a speciol odvantage that no noturol product has. It con stand operotion in high-temperature environment where rubber-insuloted cable would fail. But even more; if this cable is caught in a fire, the



Chemical Division, GENERAL ELECTRIC COMPANY, Pittsfield, Mass

insulation is burned to ashes of course—but the ashes are pure silicon dioxide, a most excellent insulator itself! In emergency situations, as aboard naval ships and on some of the giant bombers, electric cables must continue to carry power, come a hell of fire or high water! Silicone rubber is one insulator whose ash is also an insulator!

The Silicones are, actually, a family; the silicone rubbers are only one member of the large, rapidly growing, and very vigorous family. There are silicone oils, and a variety of silicone products ranging from putty that shatters like glass when hit with a hammer, flows like a viscous liquid when left alone, molds like putty between the fingers, and bounces like a golf ball, to some remarkably versatile materials.

Again—Nature didn't make it. Life never tried handling molten metals before Man came along. The technician (p. 89) is spraying a GE Silicone mold lubricant into an intricate die for casting aluminum parts. The problem Nature never solved: How do you lubricate molten metal so it won't stick to the mold?

Silicones provide wonderful unstickums. The word "adhesive" is relatively new in the language—"glue" is now a specialized kind of adhesive. But we need a newer word—the inverse of stickum, glue, or adhesive—the unstickum that will make something come off of something else.

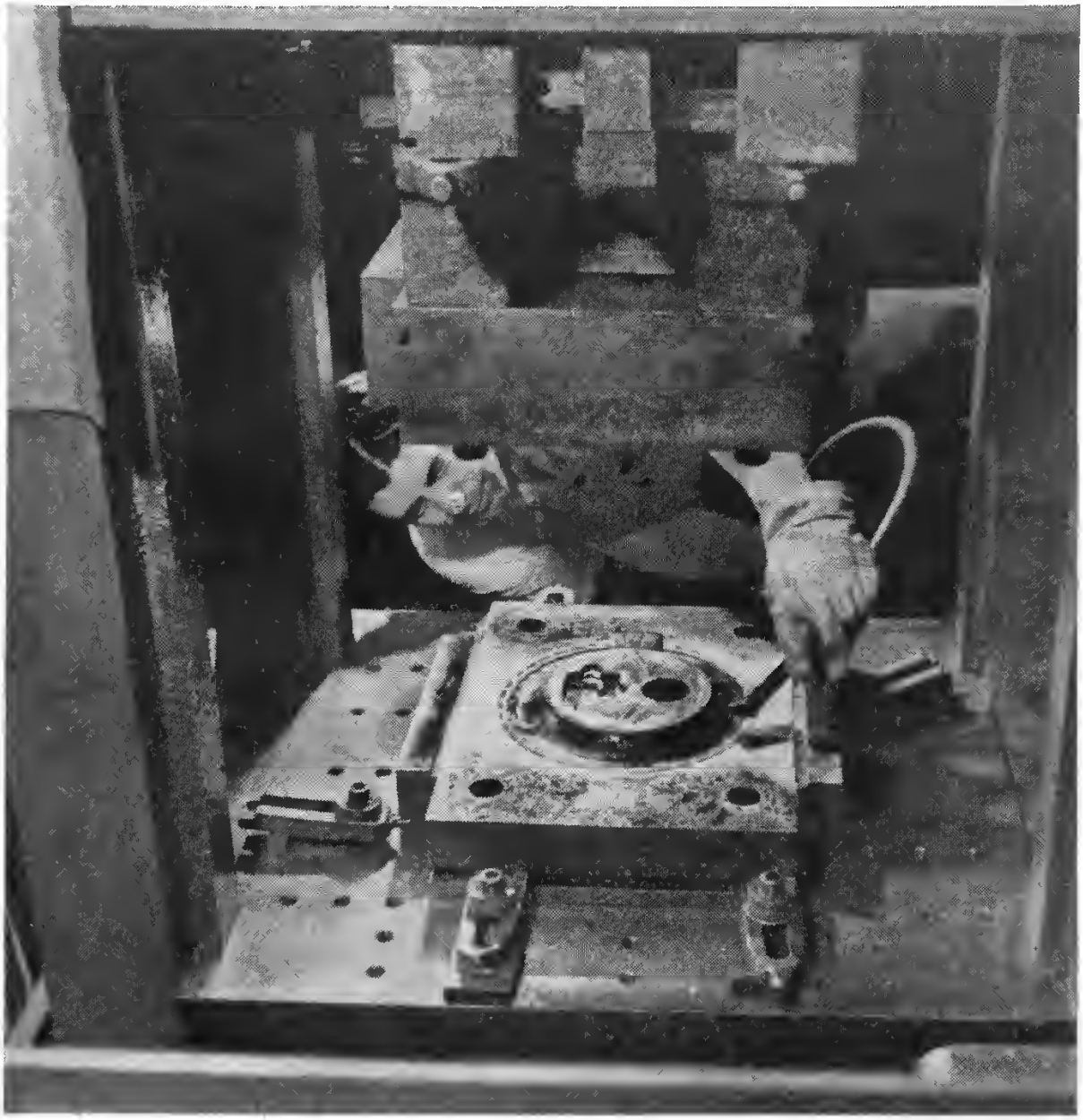
Silicones not only do it for aluminum die castings—but also for pies, cakes, bread, and the like in the baker's tins. The die-casting may be aluminum, or that oldest of thermo-setting plastics—bread—but the problem's the same. Where the traditional fats and animal greases eventually break down and make the bread stick in the pan—silicones don't.

But silicones are versatile. Differently compounded, differently structured—they stick, and unlike the proverbial leach, they stick when it gets hot. Above—

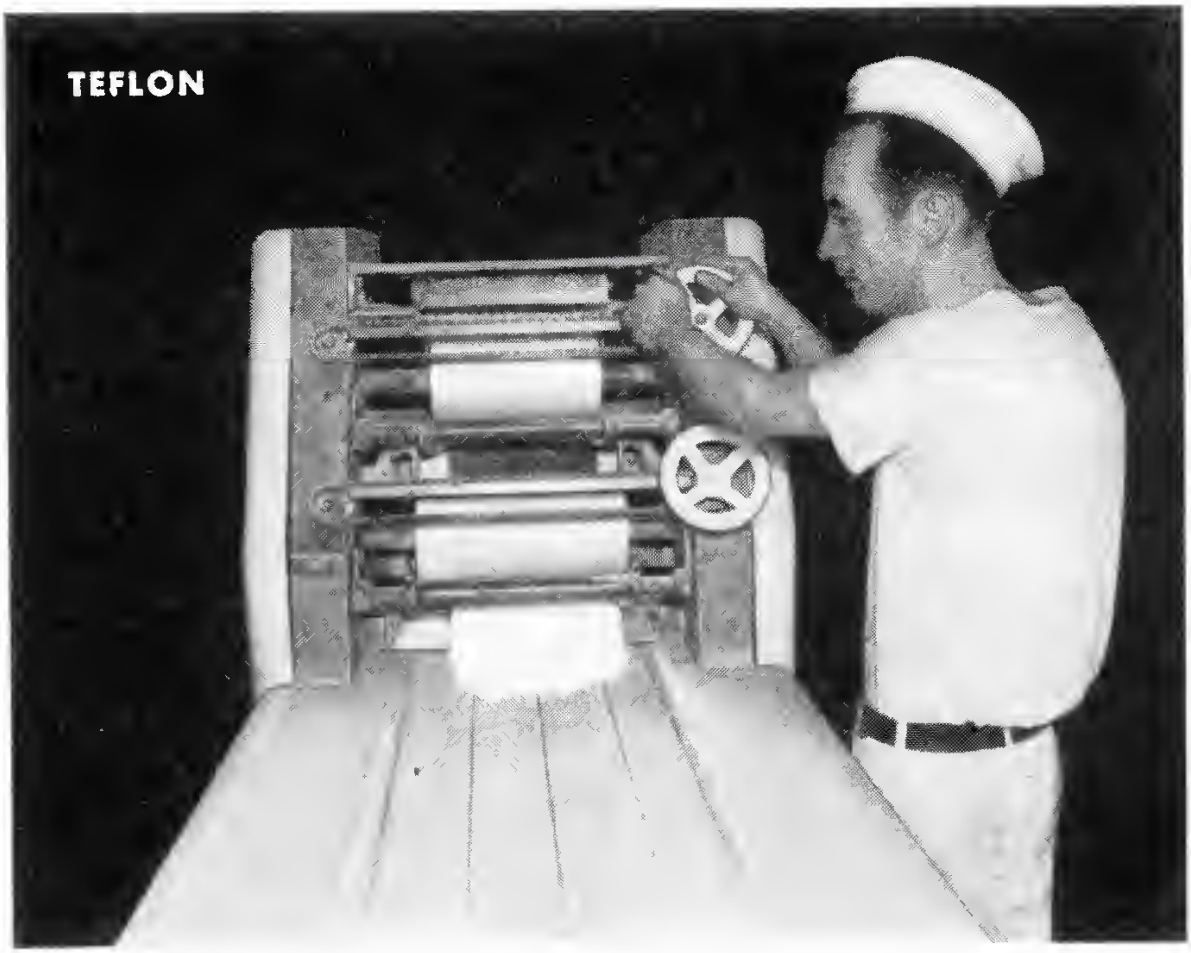
three metal panels were nicely painted and put in an oven. The oven was at a temperature of 1000°F—what a housewife might call "very, very hot", since the usual "very hot" of the domestic aven is about 500°F.

The one on the left was painted with standard aluminum paint. The other two had the lower halves painted with aluminum pigment in a silicone binder. The first panel was in the oven for twa hours; Nature's a sissy, and the natural-type product couldn't take it. The right-hand panel was in the oven for twenty-four hours. The center panel, in the original photograph, shows some signs of deterioration—a few black speckles. It was held at 1200°F for seventy-two hours.

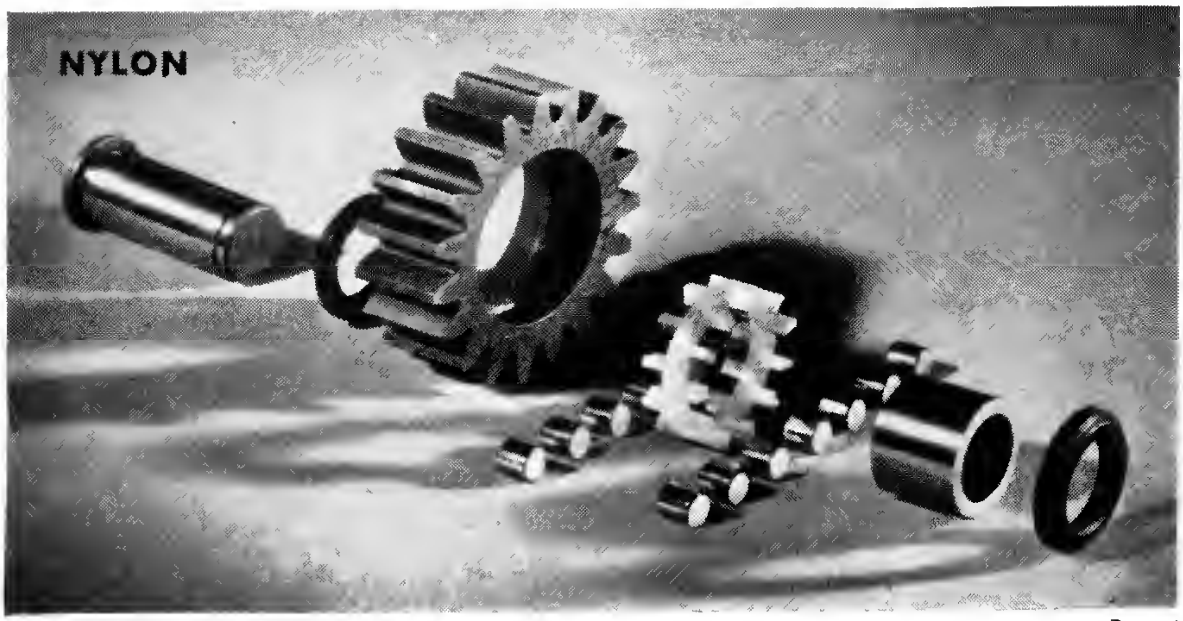
Silicones, properly compounded, definitely do stick.



Chemical Division, GENERAL ELECTRIC COMPANY, Pittsfield, Mass.



Dupont



Dupont

Teflon—

The outstanding "Nature didn't make it" item is, of course, *teflon*—the plastic material that can't be corroded, dissolved, softened, attacked, plasticized, or interfered with in any chemical way below 200°C. It will yield, slowly and stubbornly, to molten metallic sodium, but nothing much less violent affects it.

That it was originally developed to handle the viciously corrosive uranium hexafluoride for Oak Ridge is now well known; many another chemical industry has been using it where fantastic resistance to corrosion is required.

Teflon is always white; no dye will stick to it or bond with it. Teflon has a consistency somewhat like an inelastic sheet rubber. But its texture—its feel—is greasy-soapy-waxy. It is not actually greasy or soapy; the slippery feel is due to the fact that the fluorine-carbon bonds of the molecule are so extremely tight, so completely inward-directed, that there is no appreciable external bond-energy available to produce interaction with other molecules touching its surface. Therefore it feels slippery—and it won't get dirty. It's so thoroughly introverted a molecule that it won't react chemically, and won't react electrically either—it's an exceedingly good dielectric. Having such a self-satisfied structure, it doesn't absorb moisture.

So far as the outside world goes, teflon is a molecule that is described almost completely by the single phrase "It doesn't."

Its corrosion resistance is fairly familiar now; in the application on page 90, teflon's "It doesn't . . ." application is that "it doesn't stick or allow anything else to stick." Bread dough is sticky stuff; handling it has been a business of dusting with flour or greasing with lard. The machine shown has steel rolls faced with a layer of teflon; the bread dough can't stick no matter how gooey it is!

Further, being teflon, "It doesn't . . . have any tendency to flavor the dough."

Nature didn't make anything as uninterested in the exterior world as teflon—but man has a lot of uses for it, simply because it is such an introverted molecule.

Nylon—

Nylon, as every woman knows, is the synthetic that makes better yarn for stockings than does silk. Nylon first reached the public as a textile fiber; later it showed up in tooth brushes and combs. At that point, nylon was in the position of the usual synthetic—replacing some Natural product on a competitive basis; silk or bristles or horn or shell. (Combs used to be made of those materials—but even that old plastic, celluloid, long since changed that.)

Nylon still serves hugely on that front; the silk market has been almost ended, and now nylon is being displaced in its turn by still newer synthetics. That area of the business of synthetics, however, is only part of the story of nylon.

Nylon is a plastic, too—it's used in massive form instead of fibers. And nylon, rather like teflon, is a pretty introverted molecule. Not so thoroughly so as teflon—but the fact that it isn't permits it to be a stronger, tougher material. But nylon

is extremely resistant to corrosion; it, too, has the slick, semi-greasy low-friction feel. And nylon is tough—actually rather fantastically tough.

The strongest steel, used as an automobile tire, would wear out in a matter of hours; hardness isn't always the answer to wear-resistance. Rubber does the job there very nicely, by being soft but exceedingly tough.

In the shot on p. 90, nylon is used for the bearing race in a helicopter rotor—the white-toothed shape between the rolls of the bearings. It's semi-soft, yet stiff and strong enough to retain the bearings. It's tough and slippery by nature.

The best previous bearing assemblies hadn't been able to take more than twenty-five hours of service; helicopter parts operate under extreme loading conditions. The new pinion bearing, using nylon, stays on the job in perfect condition longer than the metal parts it bears.

Nylon has the characteristics most wanted in a human being—it's tough, persistent, adaptable, immune to fatigue, elastic, resists the corrosion of time and circumstance and remains incorruptible.

It's considerably more than a competitor for natural products—it does what Nature never had need to do.

And this, of course, is not

THE END

IN TIMES TO COME

The feature item in the May Astounding is going to be something unique; Professor John E. Arnold, of M.I.T. has an article coming up on the course in Creative Engineering at M.I.T. It's a unique and fascinating course indeed — in which students are being taught to invent new ideas. The most perfect memory may help a student through high school, through most college courses—but it's going to fall flat when creativity is called for.

Problem: How can an educator teach a student to *think*, to work out original ideas, instead of copying the ideas that are lying all around him?

The article explains one of the most interesting social inventions I've heard of —and a highly significant one. How to teach ingenuity!

The cover, also, will be unique; it's an engineering presentation rendering done by one of the students in Professor Arnold's course—the color rendering that a product design engineer makes to show the appearance of the product made from his blueprints and specifications.

THE EDITOR.

ALLEGORY

***The civilization** was perfect and mechanical and computed to the last decimal. And it had only one place for a new idea. . . .*

BY WILLIAM T. POWERS

Illustrated by Pawelka

The Research Guidance Center was always busy near the first of the month, for at that time the allotments for research funds were computed and distributed, and the beginning of the first week's run of Guidance checks was starting in the big computers in the subbasements.

On one Monday morning, the third day of the month, John Mark received a communication that had a considerable effect on his stability rating for some two weeks, after which, of course, it didn't matter.

Mark was sitting at his desk in the Incoming office, coding requests to initiate research. His task was mainly routine, consisting of translating various types of requests into language the computers could understand; only one out of fifty requests required any real thinking, and no more than one out of a thousand called for any kind of personal contact. His mind, comfortably locked into a smooth and ordered pattern, was stirred only by events of highly unusual nature—

He stared, big-eyed, at the application that had arrested his fingers over the coder keys.

Name, Henry Norris. Address, WJ-CHN10110011101001. Nature of projected research: Application of antigravity device to various forms of transportation.

Confusion stirred dangerously in Mark's solar plexus; his mind, well trained to handle this sensation, searched quickly through the possibilities, and handed up an answer. Mark smiled.

Carefully he red-penciled two words

in the application and wrote in two more, so that it read, "*Invention* of antigravity device *for* various forms of transportation." Then he stamped the application, "REJECTED: SCIENCE; physical," and "Data not subject to rational investigation," and mailed it back to WJCHN101100111-01001. Four days later, he got it back, with a letter.

"Dear sir," the letter said, "I have received the enclosed application, returned with the wording changed and a rejection stamp across the middle of it. Naturally the way you have reworded my application, I can see why you rejected it. However, I wish to apply for permission to apply an invention, not to develop it. Therefore, I am returning another application worded properly, and wish to have slightly more accurate handling this time."

Mark wondered why the chill went up his spine. Of course, there was nothing to worry about, but—Well, that was it, there was nothing to worry about. With a sigh he coded the application and sent it to *Science, physical.* By the time he came back from lunch the rejected form with the usual explanatory letter was lying on his desk. Out of habit he scanned it:

"Dear sir: Your application is being rejected by the Department of Physical Sciences for the following reasons:

(1) No antigravity device exists.

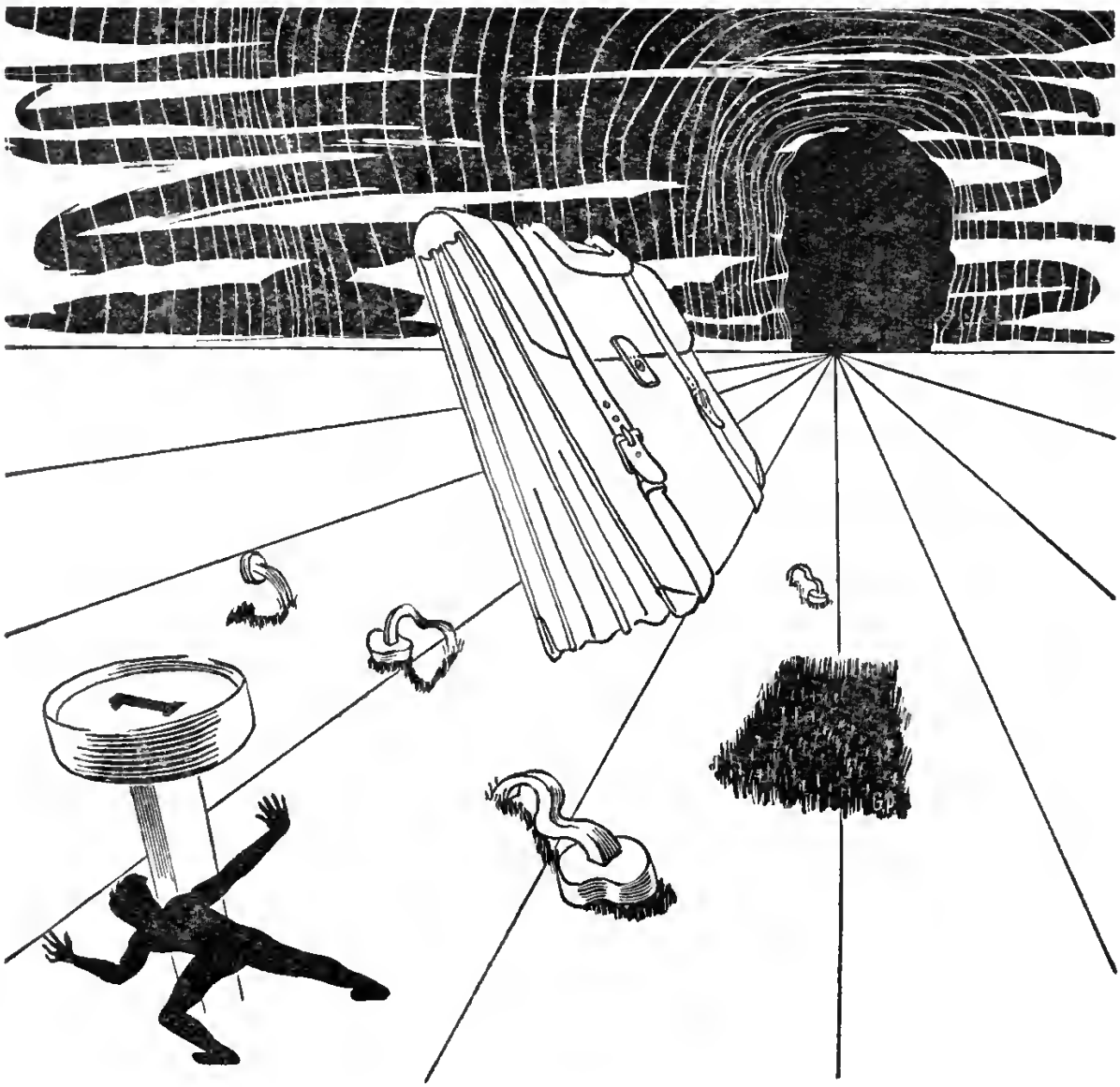
(2) The approved laws of physical science do not allow for the existence of antigravity devices; owing to certain data too complex to go into in this letter, we cannot allow computations for determining the probability of the development of such a device to occupy the services of the physical sciences computing department. We suggest that you refer to—"

There followed a long list of library codes, enumerating books and papers concerning antigravity, and a final admonition to become more versed in the laws of physical science.

Mark knew that part, so he skipped it. As a matter of form, he added a penciled note to the letter apologizing, for the initial mishandling, and sent the envelope and its contents off to the mailing chutes.

Four days later there was a letter from WJCHN10110011101001 lying on the desk.

"Dear Sir:" it said, "I have received your rejection of my application. Since nobody at RGC seems to be able to read, I shall appear personally at your office a week from the date of mailing this letter. In order to avoid any further contact with whomever it is on your staff that is illiterate, I shall bring a working model of my device and perhaps by drawing suitable colored pictures and limiting my vocabulary to the eight-year-old level I shall be able to make you understand that I have an antigravity device that I wish to apply to various forms of transportation, and that I do not want



my application handled by chimpanzees who happen to know how to type. If the computers say that the device does not exist, that is their privilege, but what the computers say seems to have very little to do with reality. I will see you next Tuesday at two o'clock in the afternoon, or if that is beyond you, roughly halfway between lunch and quitting-time. Sincerely, H. Norris."

An extremely uncomfortable feeling swept over Mark at the phrase, "what the computers say seems to have very little to do with reality." For a moment, he considered calling Medical, but reconsidered when he thought that the poor fellow was probably quite frustrated, and the letter was after all a form of catharsis. It might

be amusing to see his device, anyway.

On the way home that evening, Mark happened to look up as the evening jet from Sydney whistled overhead. It always went over about the time he was waiting for the 4:08:30, and usually he just accepted it as a part of the trip home. But today he watched it out of sight, disturbing little thoughts stirring in his brain. Supposing the jet had gone overhead without making that selzer-bottle noise, on antigravity beams—would he have noticed? He felt sure he would have, and that everyone else would have, too. He could just picture the mass uneasiness, feel the surging emotions.

That evening at supper he was unusually silent, and the next morning his wife had to go talk it over with the family psych. It had been quite a shock to her, for she had been planning exactly how she was going to tell him about the letter from her sister, which in itself was an unexpected, and therefore unpleasant, event. When John had failed to spend three-quarters of an hour reading the paper after she had set the dishes to wash, and had turned on the news-broadcast instead, her whole pattern had been disrupted. John himself even seemed a little upset that morning, but he refused to go to the psych with her.

By the time Monday morning came around again, and then Tuesday morning, John Mark had pretty well forgotten that he was going to have a visitor. His wife had fully recovered, having found that she could make up for the insecurity by making a few purchases recommended by the psych, and repeating phrases G-36-992 and -9973 several times to herself before she went to sleep. She had used those particular passages from the Auto-Correction Book before, with equally fine results.

Just about lunch-time, Mark remembered the phrase, "what the computers say has very little to do with reality." It startled him, and he began to get confused, wondering why on earth he would think a thing like that. Fortunately there was a Health-view machine nearby, and after watching his favorite actress for a few moments he was quite calm again. He ate lunch and returned calmly to his desk, where he resumed the coding.

Roughly halfway between lunch and quitting-time he remembered that Norris was due any moment. What made him remember was Norris, who walked through the door precisely at two o'clock.

"Are you Mark?" Norris asked. He had a briefcase in his hand, upon which Mark's eyes fastened helplessly.

"John Mark, yes—how do you do?" Mark said rapidly. Remembering his manners, he waved at the visitor's chair. "Sit down. Well, sir, is there some difficulty I can help you iron out?" (He vaguely remembered a

psych saying that to *him*, once.)

"Nuts," Norris said. "You no more care about helping me out than you care to slit your own throat. I brought the model."

Norris never questioned that Mark knew who he was, and Mark did not even think of asking.

"Where is it?" Mark asked, his heart beginning to pound and his eyes still darting to the briefcase.

Norris paused and looked at Mark with what might have been pity for an instant. Then he shrugged and gave the briefcase a shove toward Mark. It sailed silently through the air in a straight line toward Mark's head. There was, apparently, nothing holding it up.

Mark stared uncomprehendingly at the approaching brown rectangle. His mind kept supplying briefcase after briefcase, all leaving the one in the air and following a neat parabola to the floor, but the real one kept demanding his attention. Something began whispering in his mind, becoming momentarily more desperate.

"For every action there is an equal and opposite reaction."

"You'll fall, you'll fall!"

"Section 356, Paragraph 9, Subhead A: Gravity is—"

"I swear to uphold the tenets of Security and Welfare—"

"Remember, son, there is always a computer to turn to—"

And then, quite unbidden, "What the computers say seems to have very little to do with reality."

And then his hands reached up involuntarily and received the briefcase, and he felt it for an instant, and fainted.

As soon as he opened his eyes again, he heard Norris say, "Are you going to do that again?"

"No," he said. He picked himself up out of the visitor's chair where Norris had evidently put him, and drank the water that Norris held out to him. His face burned with shame, and he felt terribly depressed.

"Do you believe me now?" Norris said.

"Get out. Please," Mark said.

"Nuts," Norris said. "Not after eighteen years and two weeks. I am going to get this fog-bound outfit to grant me permission to apply my device to various forms of transportation, or I am going to know the reason why."

"But it's absolutely impossible," Mark whispered. "There is no possible way that you could develop an antigravity device. The laws of physics—"

"Look, friend," Norris said, somewhat more patiently, "who made up those laws of physics?"

"Why—nobody. The computers deduced them from the basic facts of the universe."

"And who said that those were the basic facts of the universe?"

"Why—that's ridiculous." Mark shook his head in confusion. "The

basic facts are the basic facts. It doesn't matter who discovered them, they're still basic."

Norris pointed silently to the briefcase—it was drifting between the desk and the water cooler, being accelerated slowly by the slight draft from the air-conditioner. Mark looked only for an instant and then averted his eyes.

"That is a very disturbing illusion," he said, "and you know that illusions are illegal. I request you to explain it at once, rationally."

"You can't get out, can you?" Norris said, relaxing. "I can't convince you that there's no trick, no illusion?"

"Why should I even try to let you?" Mark said desperately. "There's no point in it. It can't happen, so why should you try to convince me? I don't understand."

"What don't you understand?" Norris asked, going over and retrieving the briefcase. "You can see this—what is there *to* understand about it?"

"But I know what I can see!" Mark said desperately, feeling crazily like crying.

"Let me state it as simply as I can," Norris said. "In this briefcase I have a device which nullifies the attraction of the earth. It is adjusted so that it exactly balances out the weight of the briefcase. There is nothing inside the briefcase but the device, and there is nothing else holding up the briefcase. Therefore I have an antigravity device. Furthermore, I wish to make some money from it, as I have practically starved my fool head off for eighteen years and two weeks working on the silly thing. It no longer impresses me. All I care about now is being extremely wealthy so I do not have to starve while I am inventing my force-field. Do you understand that?"

"But you can't invent a force-field either!" Mark gasped, feeling ill. "According to the laws of physics, there can be no—"

"The laws of physics again," Norris said. "I am not going to throw away my plans just because some bollixed-up computer says I can't see something obvious."

Mark felt something cold seize his chest. He whispered, "I could have you thrown in prison for that. You shouldn't say things like that. The laws of physics are all that preserve our sanity toward the real universe. There is no other way of looking at reality that will not lead to psychosis—you know that as well as I do. It's one of the basic facts of life."

"And I suppose the computers figured *that* out for you, too?" Norris said. "And did the computers also tell you to believe everything the computers said? Now who do you suppose told you to believe the computers when they computed that you should believe them—the computers? Nuts."

"Nuts is an archaic expression,"

Mark said, dazed. He gripped his desk with both hands. "You need a trip to your psych. You ought to go right away, your mind is in danger. Stop it, please. You are destroying my faith in everything I believe in."

"Why do you have faith in it?" Norris asked. "Because you were *told* to have faith in it? *Do you ever think for yourself?*"

Mark gasped, "You're psychotic!" and reached for the buzzer on his desk. Norris caught his wrist.

"That won't do any good. I can rate triple-A on any psychometric. I am not psychotic—and neither are you—the only trouble is that you've accepted a very limited reality, and you've done it because you're afraid not to. Why is it so painful for you to look at this?" He indicated the briefcase.

Mark took a deep breath and got a grip on his tottering sense of reality. Quite carefully, he turned to the only source of comfort he could find:

"The law of gravity needs no proof. It has been tested thousands of times by competent authority, and it has been proven to be just what the computers say it is—mutual attraction between *any* two material bodies."

And another: "We can consider the subject of the law of gravity to be closed. No further data is needed at this time by the computer, and the computer is so designed as to indicate when more data is needed to keep the system self-consistent and in accord with the real universe." That sentence appeared in nearly the same form, although with different contexts, in nearly every section in the "Book of All Knowledge."

Mark had completed his reading of the "Book of All Knowledge" years ago, and remembered only the basic principles of it, but he knew that somewhere was the knowledge and the logic that would prove this incredible man with his incredible toy to be a faker, an illusionist, a psychotic. If he could only remember more—In the midst of his whirling confusion he had a sudden inspiration.

"Look," he said, suddenly reasonable, "I suppose it is unfair of me to doubt my eyes. But there might be one thing you haven't thought of. What do you suppose the other departments will say? After all, this is a rather revolutionary"—he felt a twinge inside—"device, and they should be consulted."

Norris objected immediately, as Mark knew he would. "But this device is concerned purely with the laws of physics and mechanics—it has nothing to do directly with the other departments. You know that nobody asking permission to apply an invention has to submit to the approval of the whole RGC!"

Mark smiled. "You yourself said that this device does not seem to be covered by the recognized data in the department of physics. Since it doesn't,

we must investigate all the data and make as fair a decision as possible."

"All right," Norris said, "go ahead. But remember, I'll be right here to make sure you tell them what you've seen. *Tell them it doesn't fall.*"

Mark went to the intercom unit and punched the "Psych" button. He said, "I have a man here who says he has invented an antigravity device. No . . . wait a moment . . . he has brought a briefcase with him that floats in the air. Yes. No apparent support. Quite interesting, but there is nothing in the laws of physics to justify it. Can't really throw the fellow out for owning it, but what do you think about granting permission to apply it to various forms of transportation?"

Norris moved closer and caught the answer. "Absolutely not. I don't even have to put it into the computer."

Norris looked pained, and the voice went on. "Antigravity would cause widespread insecurity that would wreck the system. Can't go around destroying reality like that, you know. Tell the fellow he had better hide the thing and forget about it. Tell him he can come up here for a little talk if he wants to. Must have been quite traumatic, inventing a thing like that. Is he there now?"

"Yes, I'm here!" Norris said into the intercom. "What do you mean, it must have been quite traumatic? I enjoyed every minute of it. Are you trying to tell me I can't do it?"

"Well, if you put it that way, sir, yes. That is exactly what we will have to do. Of course, you can appeal this decision, and we will feed the data into the computer. However, I can tell you that the Psych-section computer is set to reject automatically anything that interferes with the decisions of the Physical-Sciences computer. I'm afraid you'd better go spend a few weeks with a tri-di Healthview machine or turn your talents to something more productive. After all, there is practically an infinite number of undiscovered connections among the data in the 'Book of All Knowledge.' The computers only know what could be found there—fascinating things."

"All right, that's all," Norris said. "Oh—if Physics changed their decision about antigravity, would you change yours?"

"Probably," the man said, "but of course we'd have to check with Medical, too. After all, the physical health of our people is just as important as their mental health these days."

Medical was quick and to the point: they happened to contact a man with a good memory.

"No, we've had these calls before, Mark. The decision is straightforward. Seems that a Dr. Summers about fifty years ago fed the data into a computer just to see what would happen, and found that no human being could

withstand the stresses of antigravity flight. Plays hob with the endocrine balance, the blood pressure, respiration rate, and so on. Anyhow, we have a lot of data from Psych that says that introduction of a thing nonphysical like that would immediately produce mass psychosis. What did Commerce say?"

"Haven't called them yet," Mark said, smiling. "Well, thanks, see you later, Jim." He punched another button.

"Yeah, this is Commerce. What sort of thing? . . . Holy cow, it gives me the creeps to think about it! . . . No, I don't think we've ever computed anything like that before; wait a minute—the channel you need is open right now. Be right back."

After a wait of several minutes, the voice resumed, shaken. "Listen, you'd better confiscate that gadget. If it ever got out, the whole system would go right down to a security rating with zeros after the decimal point. It's poison! The computer isn't even set up to handle a new form of transportation—the fuel and loading capacities figure in, and a lot of other factors. I fed in antigravity as a fact, and the charts came out looking all bloody. No go."

Norris didn't bother to reply to that one.

Mark noticed the silence and asked, "Do you want me to call Communications and Law and Transport and Philosophy?"

"No," Norris said, rather sadly, looking at the floating briefcase. "You absolutely can't see, can you?"

"It's all perfectly plain," Mark said. "The device just does not belong in this world. Even if it were real it would still be the worst possible thing that could happen. You know what you're trying to do to the system, don't you?"

"I know," Norris said.

"Now look, don't take it so hard. I know these things seem awfully important at the time, but you'll forget about it soon enough. Why, there are thousands of things that are desperately needed, and anyone who could create an illusion as convincing as that could certainly make all the money he wants producing devices that the computers *will* permit. You're just all caught up in this thing, and all you need is to get away from it for a while. After all, eighteen years—"

"Yes, eighteen years. And two weeks." Norris laughed shortly. "Are you really convinced that what you are saying is supposed to make me feel *better*?"

"Norris, you are attacking the basic human drive, the urge to be secure, to be safe, to be taken care of. If you take away people's desire for security, then you have left them nothing to live for. Don't you see that?"

"Have you tried not wanting security?" Norris asked.

"Don't be ridiculous." Mark

started to feel uncomfortable again. "Why should I deliberately drive myself psychotic?"

"How do you know you're not?" Norris asked quietly.

Mark stared at him a long moment; he knew that that was an old, old gimmick, but suddenly he could not remember what the logical answer to it was supposed to be. Norris, watching him closely, sighed and began.

"Why do you believe the computers?"

"Because they give me my security."

"Why do you need security?"

"Security is a basic drive. There is no why to it." Mark was staring out the window, feeling strangely *caught* in something, in some web of thought that Norris was weaving.

"How do you know that it is basic?"

"The computers say it is. All the computers say so."

"Who decided that the computers would say that?"

"Nobody. It's a basic fact."

"How do you know it's a basic fact?"

"The computers say it is."

"Who decided the computers would say it is?"

"Nobody. The computers. I don't know!"

"How can you find out?"

"I don't want to find out."

"Why not?"

"The computers will provide an answer if I need it."

"Who said that you have to go to the computers for an answer? The computers?"

"Leave me alone."

"Why should I leave you alone?"

Mark broke free for a moment, and shouted, "Get out of here! You're trying to drive me crazy."

"What do you mean by crazy?"

"You're crazy! You're trying to destroy the reality of the computers!"

"Why shouldn't I destroy the reality of the computers?"

"It's all in the 'Book of All Knowledge'. I don't want to answer any more questions."

"Who wrote the 'Book of All Knowledge'?"

"The computers, the computers! You know all these things, why are you doing this? Please get out of here."

"What are you afraid of having happen? Are you starting to think?"

Mark ran to the door and wrenched it open. "Please. Get out, or I will have you arrested."

Norris stood up, gathering his briefcase to him. At the door, he turned to the dazed and trembling Mark and said very clearly, "You will continue thinking about this." And he left. A second later he was gone, and Mark sank into the visitor's chair.

He tried to think, but all that came to his mind was the series of questions

and answers, each time nagging at something in his brain as though something there was whispering, "It's so obvious, so obvious!"

It lasted all through that night, and all the next day, and on into the night after that. About two o'clock in the morning, after he had used the last of his strength in trying to sleep, in trying to think of the lake shores and the mountains, and the Healthviews, in trying to be unconscious, in trying to die, he began to weep.

They took him to the asylum a week later. He was strangely calm as they propelled him toward the gates. He watched silently as they filled out the dozens of forms, the assignments, the agreements, the legal trivia. As they approached the great gray building he began to smile, and as he waited in the anteroom to be checked in, he chuckled. Walking through the long series of locked and barred doors, he guffawed, and while the attendant spun the dials on the last and most ponderous door, he held his sides and roared. That was over soon, and he took a deep breath, like a man who has swum a long way under water. When the door swung wide, he gasped.

Norris looked up from the workbench, gestured at the huge, gleaming laboratory, the scurrying white-coated men, the racks of equipment, the panels studded with jacks and meters, and said, grinning, "Welcome to the loony bin."

THE END

THE ANT AND THE EYE

BY CHAD OLIVER

If we could spot the would-be Hitlers before they hittled—if we could find them—it would be a technician's job, working with exceedingly technical data. Would his services be welcome? Or would he need to work secretly?

Illustrated by Pawelka.

NICO: Saidyah, do you know what space is?

SAIDYAH: It is the little road the ant travels between two blades of grass: it is the great empty road my eye travels on its way to the stars.

From "Time Is A Dream," by Henri-René Lenormand.

Robert Quinton could feel it coming.

He opened his eyes, yawned, and tried not to look at the multiple color tones that rioted over the walls of the sleep sphere. He let the fresher work him over briefly and tried to pretend that this was just a day like any other day. He selected a predominantly blue-toned tunic, which was downright hypocrisy, and checked to make sure all the viewers were off. Then he secretively lit a cigarette.

"Getting to be a regular sot," he observed.

It was curious how the local customs got under your hide. The Merans on Procyon III took their stimulants via the smoking route, with a fair-sized cigarette being about the equivalent of a straight shot of high-powered Scotch. He had to be cautious about his smoking. By now, he actually *did* feel like he was sneaking a quick one whenever he fired up for a smoke.

Quinton finished the cigarette, carefully destroyed the butt in a disposer, and walked out of the sleep sphere into the open air. It was morning on Meran, and the primary sun was radiating a cheerful greenish-yellow. Cool, fresh breezes whispered up from the valley floor, and the world smelled like flowers. Quinton took a tube to a Five Transfer, where Ncarl was waiting for him.

"Blue harmony," greeted Ncarl, smiling. He was dressed in a gray tunic, indicating that he was in rather mediocre spirits.

"Blue harmony," Robert Quinton returned the greeting, quite as naturally as he would have said "good morning" on Earth.

"An odd time for a message, I believe," Ncarl said courteously. "I hope nothing is clashing."

"That makes two of us," Quinton agreed, settling himself in the tube for Communications.

Ncarl shook his head, somewhat self-consciously. It was a trick he had picked up from Quinton. "Black is in the air," he said.

"It may just be a routine message," Quinton suggested, knowing full well that it wasn't.

"You're a liar," Ncarl said.

"Isn't everybody?" asked Quinton.

The tube hummed to a halt. Quinton tried to ignore the cold knot of worry that chewed in his stomach, and followed his friend into the hum of Communications.

Quinton kept his mouth thoroughly shut. Even now, he did not trust himself to attempt casual contacts with Merans he did not know. The system was too intricate; he let Ncarl guide him through the color maze to the Contact Booth. Speaking a bit too rapidly to enable Quinton to follow his words, he checked with the booth operator, a dour-looking individual

dressed almost entirely in black. Not for the first time, Quinton was grateful that he had Ncarl around. In making relatively early connections with diverse cultures, you saved a lot of time by having a more-or-less objective informer on hand—in this case a man who corresponded to the Meranian version of a fellow anthropologist.

"All harmony," Ncarl said finally, as the black-clad operator left. "He's got it all set up for you."

"Thanks, Ncarl. I'll check with you as soon as I find out what the deal is."

Robert Quinton stepped into the booth and closed the door behind him. He sat down in the operator's chair and closed the contact switch. For a long moment, there was nothing. Quinton sat there, a tall, rather thin man, beginning to gray at the temples, with his usual quiet smile absent from his face. He was outwardly calm, but he wasn't kidding himself. The boys wouldn't call him off schedule just to pass the time of day. Of course, they might just be after information . . .

A bell *dinged* with its customary abruptness and the communicator rattled briefly. Quinton read the message: THIS IS BAC XII. IDENTIFY.

He jabbed the keys in return. QUINTON BAC UN. PROCYON III. XX5L. WHAT'S COOKING, DAN?

Again, a moment of silence. Then: UN BAC IMPERATIVE OFFICIAL. RETURN AT ONCE VIA BAC XII PICKUP POINT SIX UNIT 12.7. REPLACEMENT CUMMINGS. REPEAT IMPERATIVE. END OFFICIAL. THE JIG IS UP DARLING. MY HUSBAND KNOWS ALL.

Quinton grinned and tapped out his acknowledgment of the orders. Dan had a way of taking the bite out of unpleasant situations—but the situation remained. He opened the contact switch again and took a deep breath. Back to Earth again, after less than a year. *What could have gone wrong?* He didn't fool himself—no man was utterly indispensable in the UNBAC setup. If they had to yank him home in a hurry, that meant that things were in the stage where shades of ability and slight favorable factors were considered vital. And that meant—

He got slowly to his feet. The old uncertainty flooded him with doubt, but it didn't show on his face. He kept his thoughts to himself and left the booth. Ncarl was waiting for him and guided him out of Communications back to the tube.

"I've got to go home, Ncarl," he answered his friend's unspoken question. "They're sending a replacement —name is Lloyd Cummings, a good man—and I don't know when I'll get back."

The hum of the tube filled the silence.

"When?" Ncarl asked finally.

"Tonight. I'd appreciate it if you'd come along to the pickup and let me introduce you to Cummings. This doesn't mean the end of our work, of

course—but I regret the delay."

"No. But I will miss you, Bob."

"Yeah. I know."

The two men parted at the Five Transfer. Ncarl walked off through the green forest, and Robert Quinton went back to his Meranian home to pack his gear. It would be good to be with Lynn and Baby again—a man needed his family. And Earth, old Earth, for all his acid comments, was still his planet—and the strangest of them all.

But—*What had gone wrong?*

It was soft night on Meran, and sad as only the hush of night can be. The warm wind played in the summer grasses and the crystal stars looked down. There was something infinitely poignant about the night. It reminded a man of all the things that he had not done, all the loves he had never known. Sometimes, Quinton felt pretty sharp during the day—but the night whittled him down to size again.

"I hear her," said Ncarl.

Quinton looked up, although he knew that he could not possibly see the great cruiser against the stars. He could hear her, though; or, more properly, he could *feel* her. From far out in space, she was only a rumbling vibration, a muted murmur. Invisible, she yet dominated the land—massive, poised.

The two men watched, and shortly a tiny streak of flame arched through the night sky and hissed out of the heavens above them. The jet flames winked out and a small spaceboat hummed in on her copter blades, landing with scarcely a jar in the open field in front of them. The entry port hissed open and warm golden light spilled out of the ship. Two men stepped down, and Quinton and Ncarl went to meet them.

"Good to see you, Bob," greeted Lloyd Cummings, the UNBAC man. And then, switching easily to Meranian: "You must be Ncarl; I have looked forward with great harmony to meeting you."

Quinton smiled, seeing that Cummings knew his stuff as usual. Cummings introduced him to Engerrand from the spaceboat, and that was that. Quinton had left complete notes and advice in his sphere, and Cummings was fully competent to go on from there. Quinton didn't waste his time asking questions—Cummings wouldn't know the answers, of course. He shook hands all around and followed Engerrand into the spaceboat.

Looking back, he could see Ncarl and Cummings walking off together under the stars. The soft Meranian night touched his face. It seemed to know that he was leaving, that he would not be back. It was trying to say good-by.

If it were important enough to call him home, it would definitely not be a case of elementary-my-dear-Watson and back to Meran again.

This was for keeps.

The entry port hissed shut behind him. Robert Quinton sank into a seat and lit a cigarette. The spaceboat lifted on her copter blades for what seemed to be a long time, and then the jets erupted with a slamming roar that dwindled slowly down into a muted rumble.

"It won't be long now," Engerrand said. "I'll bet you hate to leave."

Quinton smiled. "No," he said. "It won't be long now."

Twenty-three days later, Robert Quinton by-passed the sprawling, wheeling Space City by switching over at Lunaport, and an UNBAC shuttle landed him at the division headquarters of the United Nations in New York.

He had a quick look at New York before entering the Shaft, and the New York of 2034 was the same town it had always been. It was reassuring, somehow, to know that Little Old New York was still there. The shining copters lazed along in six-level traffic under the bright afternoon sun and a transcontinental rocket flashed by high overhead. The women's skirts were a trifle longer this year, with a faint filmy area at the knees—quite daring, really. The air was fairly clean with the piped-in solar energy, but he could see traces of New York "fog" hanging over the city. Several large freight copters were sluggishly lumbering along the lower levels, headed toward the coastal sub bases. The colorful old art vendors, with their natural-abstraction projectors, were everywhere.

New York hadn't changed a bit.

At the Shaft, Quinton energized his credentials and went straight up to the Fifteenth Level, detouring around the showy administrative and public areas. His code signal admitted him directly into Lorraine's private office, which was situated in an inconspicuous part of the Shaft that nobody paid much attention to. The office itself was on the prosaic side, except for the man sitting in it.

"Hi, Boss," Quinton said, extending his hand—three weeks and two days after receiving the UNBAC imperative on Procyon III, eleven light-years from the Earth.

"What kept you?" grinned the Boss, shaking hands.

"Lovely intergalactic spy, as per usual," Quinton said. "Good to see you, Mart." He surveyed the Boss. A bit more gray at the temples, perhaps, but otherwise Martin Lorraine looked about the same—which was to say that he looked like the tri-di conception of a handsome scientist, which in turn was one good reason why he fronted UNBAC. Another good one was that he knew his stuff six ways from Sunday.

"Sit down," said Mart, "and I'll try to fill you in. I guess you're wondering what the score is."

Quinton smiled. "You might say that, yes," he said. "What's up—is

the world coming to an end?"

Martin Lorraine looked him right in the eye. "Something like that," he said, and didn't smile.

Quinton sat down. He took his time, lit a cigarette, and blew a neat smoke ring at nothing in particular. He didn't say anything.

"I'll give you a quick outline," the Boss said, leaning forward, his hair studiously awry as though to cover up his indecent good looks. "We'll smuggle you out to New Mexico to take over pronto, if the brass doesn't spot you first. There won't be time to make a report on the Meranian stuff, but I'll get Rog to fake something for the front office to keep the Wizards of Finance happy."

Robert Quinton waited silently. He was an outwardly slow man, and had often been called a lazy man due to his habit of doing nothing when there was nothing to do. He had heard the end of the world announced before—but not by Mart. He thought of his child.

"No Judgment Day junk, of course," the Boss said, reading his thoughts "No end in *any* sense if we can catch it in time. But we're stumped, Bob—it's getting away from us."

"Facts," suggested Robert Quinton.

"You live with 'em a while, then. One year ago, the computer survival probability curve took a nose dive. It's still going down."

A little man with an ice hammer began to beat on Quinton's stomach with monotonous precision. "Figures?" he asked—outwardly calm.

"Point ten," Lorraine said.

Robert Quinton didn't move. He was stunned, literally. Point ten. *That meant that the odds were nine to one against the survival of civilization as he knew it.* And computers didn't make mistakes.

"Time?"

"Hard to say. Thirty, forty years, maybe."

On the face of it, to the untrained eye, that didn't look so bad; forty years was a long time. It was like worrying about another Ice Age. But the catch was that with every second the odds got worse. When things got that critical, it was act fast—or not at all.

"Any leads?"

"Precious few. We can't find—"

The viewer buzzed and lit up, and broad brass-encrusted shoulders with a head on them came into view. Martin Lorraine smiled politely as though he hadn't a care in the world, promised that he'd check on the ore constants the very second that he saw Robert Quinton, and switched off after a few concluding pleasantries.

Neither man paid the slightest attention to the interruption.

"Nobody knows?" Quinton asked.

"Outside of Little UNBAC, no. The stock market is rising, the papers are full of rhapsodic editorials, the Space City weightless games came out as expected. The economy's sound, most

everybody is happy within human limits, and there are no ominous clouds on the horizon. There isn't even a horizon. In short, this isn't a crisis period. No one is viewing with alarm. Everything is just ginger-peachy."

"Like the guy shooting marbles in that nice sunny place below the reservoir," Quinton offered after a brief pause. "Having a fine time, but he unfortunately isn't on to the fact that someone has opened the dam a short distance up the valley."

"Exactly. Someone—or something."

There was a long silence in the little office room. It was much too still. Quinton could hear his watch ticking, and he didn't like the sound.

"I'll be going, Mart."

"Catch a copter on the roof. The transcon for New Mexico will be waiting at the port, and I've already notified Lynn and your daughter that you're coming. I'll be down as soon as I get through another round of bigwig conferences to get money for you guys." He paused. "I don't have to tell you to watch your step."

"No. You don't have to tell me."

"Take care of yourself, Bob—and give Lynn a kiss for the Boss."

"See you shortly, Mart. Maybe we'll both get back to Meran one of these years."

He left Lorraine's office. No one paid any attention to him, save for a casual nod here and there; everyone was busy with Big Problems. He caught the lift for the roof. *Maybe we'll both get back*, his voice echoed in his mind as he smiled vacantly at the lift's other passenger. And another echo laughed at him:

And maybe we won't.

When Robert Quinton stepped off the transcon at New Mexico Station, Lynn and Baby were waiting for him in the desert sunshine. He walked toward them, heart pounding, the old thrill racing like electricity through his veins.

He never remembered afterward what they did or what they said in those first magic moments together after their periodic separations. There were only impressions, confused and fleeting, and the smell of the sun and the sky. Lynn was incomparably beautiful because he loved her, and Baby was ten years old and beginning to look like her mother.

"We've been lonely, Bob—"

"Daddy, Daddy, did you bring me a surprise—"

"Getting old, gray hairs, supper's waiting—"

Being apart was no fun, but maybe it had its compensations. Any two people got pretty used to each other when they were together every day, but when they were forced apart and then came back to each other it was like falling in love all over again. These meetings, these first breathless moments, were beyond value—and what else, in all the worlds, really mattered?

Nothing, nothing, nothing, his mind whispered exultantly.

But already, as they walked slowly across the tarmac to where their copter waited, the long shadows of the afternoon sun crept blackly at their side, and a cool north wind rustled across the land.

Early the next morning, Robert Quinton walked into the UNBAC computer station and went directly to Carr Siringo. Siringo hardly looked up when he entered, and Quinton didn't try to hurry him—having found from long experience that Siringo had a distinctly negative reaction to being pushed. Quinton deposited himself on a metal stool, lit a cigarette, and waited.

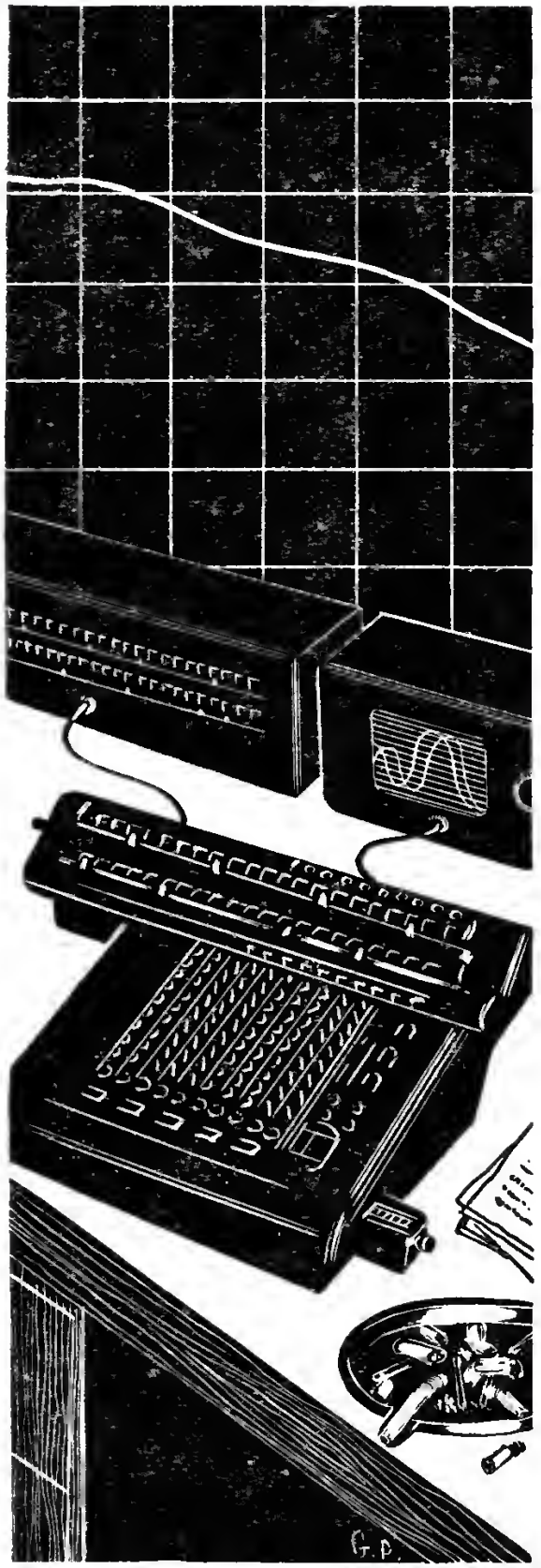
If Martin Lorraine looked like a tri-di conception of a clear-eyed, noble scientist, it was equally true that Carr Siringo reminded one instantly of the prototype of all mad fiends out to blow up the planet with an invisible ray. He had been compared variously with the Devil and a cockeyed angel, usually the former, and it didn't take much imagination to see why. Siringo was short, fat, and bald, and he was never still. He ate prodigiously, worked hugely, and lived in Gargantuan style. He worked on problems because he loved problems for their own sake, and once he had the solution he lost interest completely and launched himself into something else. He didn't care a hoot for the world, humanity, or anything else apart from the incredible world of his own mind. There was a firm conviction among his co-workers that he would never die as other men died, but would simply vanish in a puff of blue flame on some distant day when he really got wound up on a problem he couldn't solve. He was indispensable, of course, and Quinton respected him for what he was, although he never felt entirely comfortable in his presence. On his part, Siringo called Quinton a "humanitarian," and when he said it, it was an insult.

"Back to save the world, hey?" Siringo said finally, without looking up from the computer, in precisely the tone of voice he would have used to remark, "I hear your wife has leprosy."

"Probably not," Quinton said slowly, declining to lose his temper. "There's always a chance—a good chance—that the factors will change favorably without any help from us. There's always a chance that a broken copter will fix itself if you just let it sit and swear at it every day as you walk to work. I just like to play Hero, that's all."

Siringo laughed shortly and changed the subject. "What'd you get on Meran?" he asked with a flash of interest. "How about that consanguineous family system? What about the mental tri-di? What is the significance of banded clothing? What are—"

Quinton blew a smoke ring at his face. "You tell me, I'll tell you," he



said. "What've you got?"

Siringo raised his absurdly thin eyebrows. "Talk to Wonder Boy," he advised. "And after you tell us dummies what to do to save Beloved Terra, come on back and we'll have a beer."

"Try not to smash anything," Quinton told the man who was probably the finest technician in the world. He left then, and didn't hear, or want to hear, the pungent remark that filled the room behind him.

"Wonder Boy" was John Bordie, whose official title was Chief Correlator, and whose actual job it was to sort through the mass of data sparked off by Siringo and try to make some sort of sense out of it. Prolonged contact in the tiny UNBAC station had made him regard Siringo as something either more or less than human, and he welcomed Quinton with all the enthusiasm of a fellow tourist on a desert island.

"Meran must have been nice," he said after they had exchanged greetings. "We'll have to talk about it sometime, Bob."

Quinton smiled. *Nice? How did you translate stars into words?* "Yes," he said. "We'll have to talk about it."

Bordie got down to business. "Here's what we've done, Bob," he said. "We've put every available man on it, sparing just enough to fake the usual station activities and make the joint look respectable. We've arbitrarily divided the possible causes for the

down-curve into five classifications, and worked them through the Mad Genius and his computers."

"Um-m-m. The usual five?"

"Generally speaking, yes. Extra-terrestrial, embracing such star systems as we know, the planets on which we have colonies, Luna, and the space station; Cultural; Technological; Personal; and Unknown—the latter being anything not caught by the first four. We've been going full blast, cutting security precautions to a minimum. But the Snake dropped another point the last time we checked it; Lorraine doesn't know that, and he won't be happy."

Quinton didn't say anything.

"We've abstracted the essentials for you, and you can pick them up in Classified. Tentatively, I'd say we'd ruled out any non-earthly cause, but you'll have to interpret for yourself. I don't put any stock in that Unknown stuff—that's Siringo's baby. Aside from that, we know precious little. If we could only work out in the open—"

"But we can't," Quinton finished for him. "If anyone finds out what we're up to, we won't have to wait for any world to end. Our name won't even be mud."

John Bordie shrugged. It was too late to start worrying about that; that was something they all had to live with—or try to.

"Any concentration at all?" asked Quinton.

"Not much. There's the usual stuff—the press yapping about the morals of the teen-agers, a couple of new religious cults, lots of good protest literature about inhuman scientists, some national incidents of a minor sort, some joker down in Mexico who says he's the Aztec Cuauhtemoc and wants to change the name of Mexico City back to Tenochtitlan and start a holy war against Spain, a spurt in membership in the Anarchist Party, and Aunt Tillie back under a doctor's care with a backache. You name it, we got it. What a planet."

"There must be some concentration," Quinton suggested, smiling.

"Well—maybe. I'd say the United States, but maybe that's just national pride."

"What does Siringo think?"

"God only knows, and I wouldn't put any money on *that*."

"Well, let's start breaking the United States down into areas, John. It might turn up something, and at any rate it'll give Siringo a chance to work off some of that nervous energy. You got an analyzer I can use, for what I don't get done at home?"

"Sure—use Four. I'll slap a restricted on it until you give me the clear wave."

"Fine. I'll go digest this stuff, and then we'll start asking questions." Quinton drummed his fingers absently on his knee. "Can you spare Conway? I'm going to need a bright boy."

"Check. My best to Lynn, and tell Baby I'm waiting for her to get a little older."

"You won't have to wait long—and you'd better start loading the parcheesi dice; I hear the kid is getting pretty sharp."

"Beginner's luck," Bordie said sourly.

Robert Quinton picked up the data abstracts at Classified, and left the Station for home. Even on viewer tape, the abstracts were bulky. He knew that he was in for a protracted siege of learning. A man couldn't even keep up with his own planet any more, much less with the universe. He had a momentary vision of an extensive interstellar civilization, and felt decidedly sorry for anyone mixed up in it.

It was early afternoon in New Mexico, and on the hot side. The land as seen from his copter looked sleepy and pleasant, with the green farmlands rolling along under him like eternal verities. They seemed to say that they had always been there, would always be there, and that he was a fool for not tossing the abstracts overboard and taking off for the nearest trout stream.

But Robert Quinton felt oddly cold in the hot sun. A century ago, that green farmland had been desert. It only seemed eternal, obvious. Once it had been obvious that the blazing sun above his head had gone around the Earth below him—you could *see* that that was true, and had always been true.

A century ago, desert. And a century hence—?

The long days passed, and they were good days. Robert Quinton worked, and worked hard. There were red streaks in his eyes and he was hard to live with. There was a terrible, driving urgency behind his every move, with rest when he could fit it in. But it wasn't exciting work, and there was nothing dramatic about it. It was grinding, digging work—and it had to be done.

Just the same, it was good to be home.

Every man has a place he calls home, no matter how many places he may live in. In Quinton's case, it was an old-fashioned Frank Lloyd Wright type of house that blended in with the soft browns and greens of the New Mexico hillside. It had a small, clean stream that bubbled through the living room and out into the patio, and the glass-and-rock walls were open and spacious. Quinton had often wondered why he was so conservative in his housing, but somehow he just didn't care for the turret-and-gingerbread style of the modernists. And this was a good house, *his* house, made into a home by the years that he and Lynn had lived in it. It had his kind of soap, his kind of casualness, his kind of books, and it was his kind of house.

Then, too, there was the statue. It stood arrogantly on top of the piano, and it had originally been a whisky ad. It was the bust of an elderly, aristocratic gentleman with a monocle and a somewhat bemused expression. Into

the base of it Quinton had carved a name: *Cuthbert Pomeroy Gundelfinger.* This was sort of a private deity, and a very useful one. Whenever someone came to visit him that he did not know, Quinton simply waited until he saw the statue. If he laughed, he offered him a drink. If he asked who Cuthbert Pomeroy Gundelfinger was, he made polite conversation and waited for the caller to leave.

At the moment, Lynn was picking fresh fruit out in the garden, and Baby was avidly watching the tri-di. It was a science-fiction story she was watching, and Quinton smiled to himself as he glanced at it. It was routine stuff about the Twenty-fifth Century, involving the usual space pirates, matter transmitters, a mad scientist who looked enough like Siringo to be his twin brother, and a clear-eyed hero in a blue and silver uniform who was dashingly engaged in saving the world. Why was it, he wondered, that all these stories envisaged technological marvels by the bushel, but seemed to assume that social structure and culture wouldn't change in over four centuries? Why were they fighting all of today's local issues in the Twenty-fifth Century? Why, it was less than a century ago that nations had still had colonies, and nobody had even heard of Charles Sirtillo or Intelism!

And why did they persist in imagining that saving the world was a popular pastime? It wasn't, and never had been. Quinton lit a cigarette, no longer smiling. Saving the world was for crackpots, idealists, and impractical dreamers; everyone knew that. It was a standard joke, and world-savers were about as popular as plague carriers. The popular man, the practical man, was the guy who did the expected thing, the socially approved thing, and never questioned whether it was right or wrong. If everyone else was doing it, why then, naturally, it *was* right.

They had a name for world-savers.

Suckers.

Quinton put it out of his mind. This was a battle that he had fought with himself long ago, and he had won. He worked on, sifting through the abstracts, getting the feel of the situation. The sun was warm outside, and there was a lazy insect hum in the air, but he stuck with it.

There was nothing else to do—for him.

The days raced by and became weeks.

Computers chattered and banged and clicked. Analyzers sorted, chewed, classified. Data flowed into New Mexico station in daubs and tricklets and underground rivers. The UNBAC men sweated and argued and threw rocks at the trees.

It was all very dull, to an untrained eye. They discussed culture correlations and integrative principles, diffusion receptivity and Uncle Charlie's beef against the tax collector. They sat up all night with a computer. They

lost sleep and insulted each other with vast regularity and fineness of distinction. And they worked together on the toughest problem of all—putting two and two together to get four.

When it came, the setting was anything but impressive.

John Bordie leaned forward over the smoke-burned table and frowned at his parcheesi dice. Martin Lorraine, AWOL from his New York office, did his level best to look sloppy in a Y-shirt, but only succeeded in looking like the typical tri-di hero exhibiting Pose 7-X-4b, Casual Masculinity Without Pipe Or Dog. Bob Quinton slouched his long frame in a chair, his hands in his pockets, a cigarette glowing unhealthily from the corner of his mouth. Carr Siringo charged up and down the room like an impatient dragon; you could almost see the fire squirting out of his nostrils.

A young man hurried into the conference room with a microplate. He was terribly earnest and excited when he handed it to Lorraine, and probably didn't even hear Siringo's contemptuous snort.

"We've got it," Lorraine announced briefly. "The curve took an upswing on M-97. It's a man."

Robert Quinton smiled broadly.

"Clean living," suggested Siringo.

John Bordie fingered his dice. "We've got to be *sure*," he said.

"This is as sure as we can get it until we try it for keeps," Martin Lorraine told him slowly. "The hypothesis has been tested from every angle we can work, and the survival curve has indicated we're on the right track."

"And where do we go from here?" Bordie asked.

"Well, let's see what we've got," Quinton said. "We've established two facts: the factor that's causing the Snake to drop is a personal one—that is, it's a man we're after—and the threat is located in the United States—according to Siringo, somewhere in Texas, Arizona, Louisiana, New Mexico, or California. The obvious procedure from here is to narrow that area down, and then find him, whoever or whatever he is. And then—"

There was a short silence.

"We'll cross that bridge when we come to it," Lorraine said decisively.

"As the man said when he stepped off into the chasm," muttered Carr Siringo with an unpleasant grin.

Quinton turned, started to speak, and then held his tongue. Carr *was* irritating—but he had a habit of being right. As usual, Siringo had placed his stubby finger unerringly on a very knotty aspect of the problem.

Quinton replaced his infinitesimal fraction of a cigarette with a fresh one, feeling for all the world like an alcoholic on a prize binge. They were looking for a human being, that was definite. In a way, that made it easier. In another way, it spelled out trouble.

The catch was, of course, that the man—if it was a man, and not a

woman—hadn't *done* anything much yet. In all probability, he was not even a well-known personality. He might even be a child. He was certainly no wild-eyed schemer in a black coat making atom bombs in a secret lab high in the mysterious Ughflutz Mountains—or at least that wasn't likely.

He might be anyone, anything.

It was not so much *who* he was that made him important. It was *when* he was and *where* he was.

They were looking for Hitler—a man made dangerous by the conditions around him. They were looking for Hitler—*while he was still a house painter or a corporal in the German army.*

It was tough, of course. It was always tough. But it was far simpler, and a lot less bloody, than going after him when it was too late, when he was already a powerful dictator, when you had half a world to fight instead of just one man. *Just* one man? Quinton smiled. They were dealing with a human being, and that could be messy—and dangerous.

"O.K., Siringo," Quinton said. "Let's go into a huddle. We'll see if we can't narrow that area down to something we can work with; we can't do anything until we do that. When we get the picture in focus, we'll see about stepping off that chasm."

Carr Siringo's face was expressionless. "It's your funeral," he said.

The men got up from the table. John Bordie smiled a cold smile and tossed his dice on the table with a practiced hand. In spite of himself, Quinton watched the bouncing cubes of ivory with fascinated attention.

Snake eyes.

The mother spider spun her web across the land.

The slender, invisible threads from UNBAC crept out across fields and towns, villages and county fairs, probing. At first, they were widely spaced, resting on Louisiana, New Mexico, Arizona, Texas, and a part of California. The days slipped by.

The web grew tighter, stronger.

California dropped out, and then Arizona. Only fragile wisps clung to New Mexico and Louisiana, and then even these disappeared. The web contracted over Texas, seeking, hesitating. It grew smaller, smaller—

It tightened over Texas. It inched down from Fort Worth and Dallas, across from Laredo and San Antonio. The computers and analyzers hummed and buzzed through a haze of cigarette smoke, testing, eliminating. *What would happen if—? Supposing that he were here, what would—? If the X concentration is here, and the Y factor there, then—?*

The web tightened. It gripped a tiny area bounded by Bay City, Houston, Beaumont, and the Gulf of Mexico. It shrunk still more, contracting like a shallow puddle in the sun. It flowed together, stopped. The web made a black dot on the map of the

Texas coast.

"That does it," said Martin Lorraine, his usually too-handsome face lean and ugly with strain.

"Galveston," said Robert Quinton, sinking down into a chair. "Our man is in Galveston."

"Chalk up another one for you, Carr," John Bordie said. "Nice work."

Carr Siringo stopped his pacing, shook his head impatiently, and walked swiftly out of the room. It was almost as if he had been caught off base by Bordie's words; Siringo had lived so long in his private world apart from freely-expressed emotions that he foundered when he unexpectedly found himself being complimented. He was like a fish in air. Not for the first time, Quinton wondered what had happened, long ago, to make Siringo the kind of a man he was—and also not for the first time, he decided that he did not want to know.

So their man was in Galveston, he thought. Now they would have to start a precise screening process of the city's fifty thousand inhabitants. It would be a difficult job, and time-consuming, but it would not be essentially different from the techniques used to narrow the critical area down to one city. Without the computers, of course, the job would have been impossible. Even with the computers, there was going to be plenty of leg work involved.

But it *could* be done.

Who was he, this man set by chance into the fuse area of an explosive situation yet unborn? What was he doing now? Was he a genius of a sort, or just an ordinary guy who happened to be in the wrong place at the right time? He could be *anything*, Quinton realized. An idiot can change history as profoundly as a brilliant schemer—or even a germ.

"Me for coffee," said Martin Lorraine.

Quinton and Bordie nodded and followed him out of the Station into the New Mexico night. A half-moon slept in shadows. The stars twinkled as they had for the millions and billions of years of Earth's existence, and seen so, on a summer night from Earth, they were only stars again. Robert Quinton smiled a curiously sad smile.

It was good to see them just as stars once more.

The three men walked through the cool night air to Harry's, where a red neon sign still shone cheerily in the night. Harry's stayed open late, catching straggling Station workers and occasional night-fliers on the road to Folsom. They walked in and perched on counter chairs, while Harry, unbidden, got the sausage and eggs and coffee working. The music box was still for once, and the men did not talk.

They were all thinking about one man. A man they had never met. A man whose very name they did not know. Quite possibly, he, too, was sitting in a late hash house, smoking

and sipping coffee, thinking—

Robert Quinton sat very still, feeling the silver moon rays paint the hills outside. His thoughts turned, as they often did, to the little town of Folsom a few miles down the road, where long ago flint artifacts had been found with fossil bison, establishing positively the antiquity of man. Ancient man in a New World that Columbus had "discovered"—some twenty thousand years too late. Quinton looked down at the plastic floor. Under that floor was the land, and across that land men like himself had once hunted the mammoth with spears and sung strange songs beneath that same cold moon that still drifted through the night seas.

No man knew what had happened to the Folsom people—or to the later Pueblo groups who had walked off and left their homes to the desert winds long before the white man came. Quinton closed his eyes. Here in the southwest, men had built a civilization before—and had vanished into nowhere, leaving only ghost structures and a few mute pieces of chipped flint to mark their passing.

A cool night wind swished across the grasslands and rattled the windows.

"Let's go home," said Robert Quinton.

"There's our man," said Pat Conway, three weeks later.

Robert Quinton followed the psychologist's pointing finger and saw him. The man came walking out of the courthouse, his hands in his pockets, absently whistling convenient extracts from "But Oh! Those Bars on Mars," the old drinking song. He looked like the guy next door, the guy who sat next to you at lodge meetings.

He was the most dangerous man in the world.

Quinton eyed him closely. The man was of medium stature, a bit on the thin side. He looked hard and muscular, but that could have been imagination. He had very light, straw-colored hair, brushed straight back. He was dressed conservatively in a green business cape with a brown-and-yellow neckline. He was tanned and he had a ring on his left hand. As they watched, he stepped into a shuttle and hummed off westward, toward the old causeway.

"No need to follow him," Conway explained, steering Quinton to their parked copter. "We can pick him up again on the way to his house."

They got into the copter and lifted up into a cloudy gray sky. Quinton let Conway handle the controls, and when they had gained some altitude he looked down and watched the Gulf toss and roll restlessly off the island, sloughing off white breakers that bubbled in and broke on the colorless sands. It felt like rain, and there were very few bathers on the beach.

"Doesn't look like much, does he?" asked Conway.

"No," agreed Quinton. "Neither

did Napoleon for that matter."

Conway grinned. "But take Josephine, now—"

Quinton relaxed a little, listening to the hum of the copter. Conway was a good man to have around, a good man to work with on a job like this. He knew how to laugh. Pat's appearance was deceptive, to say the least. He was thin and animated, with a lively and expressive face. He cut his hair short to the vanishing point and affected violent clothes and suspenders. He looked like he was perpetually on the verge of going into a soft-shoe routine on a burlesque stage—which he had been known to do upon occasion—and he had fooled a good many people who couldn't look beneath the surface.

The copter intersected the shuttle route and lazed along above it, following it across the island toward where the almost abandoned causeway stretched away to the mainland. It looked like a toy dropped by a child, but Quinton could see a few old men fishing on the gray spans. His eyes returned to the shuttle beneath him, the shuttle that carried the man who had unwittingly called him home from the stars.

The man's name was Donald Weston. It was an average sort of name, the kind that you wouldn't look at twice. The viz books were full of names like Donald Weston. It was a non-dangerous, pleasant sort of a name. Donald Weston was twenty-seven years old, and had been educated at a small Texas secondary college. Since his graduation four years ago, he had been doing moderately well on the surface, though not sensationally so. He was an officer in the Galvez Syntho Supply Company, which was engaged in selling special supplies to the Mars and Venus colonies. It was a very ordinary sort of a job.

Recently, Weston had shown mild symptoms of political ambitions. He had announced as a candidate for City Councilman, a position of minor importance, but one that could serve as a stepping-stone toward bigger things. The UNBAC scanners had gone over Weston with a finetoothed comb—his old school records, his associates, his background—and had found very little of interest. There were a few intriguing hints of outside activity, but for the most part Weston seemed almost painfully average.

Camouflage, Quinton wondered, *or accident?*

The gray clouds turned a shade darker. Big, fat drops of rain began to patter down on the copter cowl, and Quinton saw the fishermen far below start to scurry for shelter. Hissing rain sheets swept in across the Gulf and thunder rolled faintly in the west.

As the copter hovered discreetly in the distance, they saw Weston hurry out of the shuttle and run through the rain to his small suburban home. There was a warm glow of light as the door opened, a glimpse of a woman with goldenhair, and Weston was gone.

"Well, back to the salt mines," Conway said, and turned the copter in a slow arc.

Quinton looked at the slanting rain and listened to the fast drops patter on the cowl. He felt a cold chill inside him that was not due to the rain, and Conway's light talk didn't ease it much. They had seen their man, and both of them knew what that meant. They had to get him, and it wasn't going to be easy. They were outside the law, men without legal status, and if they got into hot water they would have to get themselves out—or not get out at all. They could expect no help from UNBAC if they failed. They could not even *ask* for help.

It was cat and mouse—and no ordinary mouse, either. Sometimes the cat didn't get back.

Below them, almost invisible, the gray buildings of the city huddled together to keep warm. A city full of people, Quinton thought, and one small copter lost in the sky. It was a deadly game they were playing, and the city didn't even know. Had it known—if it found out—it would turn on them with the mindless ferocity of a beast gone mad.

Quinton looked down, thinking. The sea leaped and roared in a rising wind, and now the beach was deserted. An old beach umbrella rolled along the sand, waiting for the sun.

"Take a look at this," said Pat Conway.

Robert Quinton looked up from the paper, where he had been reading one of Weston's campaign speeches, and took a sheaf of film blowups from Conway's outstretched hand. He glanced at the psychologist questioningly.

"We got a chance to get inside last night while the Westons were out lapping it up at a business party," Conway explained. "A couple of the boys and myself picked the house over, and we got a sheaf of manuscript in Weston's handwriting under a false bottom in an upstairs desk. We photographed the lot—seems that our boy fancies himself to be another Machiavelli."

"Um-m-m," said Quinton.

"Just a clean, red-blooded American boy," Conway observed. "A credit to the force."

Robert Quinton started to read the blowups and felt the cold knot tie itself like ice in his stomach. He lit a cigarette, but the smoke seemed cold, black, gritty—

Weston's manuscript was charming stuff.

Night.

Black, black night and the red blood flowing. It swirls and eddies around my legs. It soaks me and mixes with my blood.

In the black night.

I walk through the black world, and it is red. I see it but I cannot speak. It is too red. I walk through the world, and I think.

In the black, black night.

They do not see me. I am alone. I will be one of them, a part of them. And they will be a part of me, slowly. Redly. I only want to help them, but they cannot see me. It is too black. It is very hard, but I will do it. For them.

I love them.

I walk on.

In the black, black night—"

There was more, much more, and Robert Quinton read it all. When he had finished, he did not speak. He put the blowups down, got to his feet, and walked out of the building. Out into the open air, the blue sky, the people and the sunshine.

So that was Donald Weston. Not much, now. A clever man, a warped man. Perhaps even an evil man, although Quinton was wary of the word. He wasn't particularly dangerous — yet. Not until his moment came, a moment yet lost in the twisted paths of future time. But the moment would come, inevitably. It was in the cards.

The cards had to be reshuffled.

What was it that the man had written? "*I only want to help them, but they cannot see.*" Was that so very different from what UNBAC was trying to do? *Was it?*

Robert Quinton watched the people passing him. All kinds of people. Men, women, children. Drunks, lovers, dreamers. Kids on their way to the beach and businessmen on their way back to work. Happy people, sad people. Contented people and people who would one day throw themselves from

copters just to get away from it all. They weren't worried about survival, these people. That wasn't fashionable, and never had been. They just wanted to be let alone, and Quinton didn't blame them.

Was there a difference, a difference between a Weston and an UNBAC? There was one difference: *reason.* Reason, logic, science, humanity. Words, of course. Just words—but a man had to have something, had to believe in something down deep, even when believing wasn't popular. Man had been given a mind, and with that mind he had evolved science. Science was a tool. Were they wrong to use it?

Were they just kidding themselves?

The people who walked by him wouldn't like him, if they knew. They would turn on him, hate him, fear him. Weston, on the other hand, was a man they could put their trust in, believe in. He was a regular guy.

Robert Quinton walked on down the beach, alone in the crowd The sea breeze whispered in his ears and the hot sun burned his shoulders under his shirt. Tomorrow, they would go after him.

If they failed—

"Sit down, sit down," said Donald Weston pleasantly. "Drink?"

"Thank you," said Robert Quinton, smiling. "Scotch and soda, if you don't mind."

"Fine, don't mind at all," Weston assured him, his voice warm and exceptionally friendly. "Honey—"

Jo, his wife, vanished into the kitchen to fix the drinks. She was a magnetic, blue-eyed blonde, the kind that dominated a room just by being in it. Quinton sat back in his chair, relaxed, and surveyed the room. It was just as Conway had described it to him; comfortable, but not pretentious, in good taste. A few books were in a case against one wall. They were of the type usually displayed in homes not much addicted to reading—several book-club best-sellers, a treatise on how to keep your figure slim by living on orange juice, a family Bible, a volume of condensations from the *Reader's Digest*, and a set of Greek and Roman classics, from Homer to Marcus Aurelius. The latter were spotlessly clean and unread. Jo emerged from the kitchen, smiled engagingly, and handed him his drink. She had fixed one for herself, but her husband did without.

"I'll try to come right to the point," Quinton said, after sipping his drink. "I know you're a busy man."

Weston waved the remark aside, his straw-colored hair neatly combed as always. "Lots of time," he assured him. "I've been looking forward to meeting you; I'm very flattered, really, that you think I have any possibilities along those lines."

Jo smiled.

"Our business is finding men with potentialities," Quinton said truthfully. "Finding them and lining them

up before they get too expensive. It's just good business."

Jo produced an ashdisposer when Quinton fumbled for a cigarette, and he paused to light up. Weston didn't smoke, his green eyes sharply alert in contrast to his easy-going manner.

"I know you've read our letters with care, Mr. Weston, and looked over the literature we sent you. I think you will agree that we have made a generous offer?"

"Certainly, certainly," Weston said. "I appreciate it."

"Your name was suggested to us by various sources here in Galveston, Mr. Weston, and—"

Weston waved his hand. "Please," he said. "The name is Don."

Jo smoothed her long skirt over her silken legs.

Robert Quinton found it difficult not to let down his hidden guard. These people *were* charming, and no doubt about it. Sitting here with them, in their homey living room, it was virtually impossible to fear them. They were typical to an extreme, even idealized. And yet—

"*Black, black night, and the red blood flowing*—"

"Don, then—and my name is Bob. Your record in college, and your enviable reputation here in town, together with your often-expressed interest in the Mars Colony, has convinced us that you are one of the men we are looking for. Now, I'm not going to make you any sales-talk; you know as well as I do the prospects and opportunities you would have with our company on Mars. There's no question of success or failure involved; it's purely a matter of how far you can go. We think you could go a long way with us."

Or without us, Quinton thought. He remembered: it was not so much *who* he was that made him deadly. It was *when* he was and *where* he was. The *who* and the *when* couldn't be changed. That left the *where. They had to get Donald Weston out of Galveston, and do it legally.*

"It's a break, all right," Weston said. "We know that."

Quinton nodded, feeling the sweat in his hands, and took a deep drag on his cigarette. "You bet it is. I know that you two have talked it all over, and have looked up our company's standings and ratings to check on what we've told you. I've taken the liberty of bringing some papers with me this evening, and the rest is up to you." Quinton crossed his mental fingers—tight. He smiled. "What do you say, Don?"

"I'm afraid our answer is no," Donald Weston said, smiling back at him. "I've decided not to accept the position."

Robert Quinton's heart took a long nose dive to nowhere. He kept his face expressionless, except for a polite look of disappointment. Their strategy had failed, completely. Donald Weston was going to stay right where he was.

How much did the man know?

Quinton looked into the other's eyes. They stared back at him, guilelessly. They were open, frank, friendly — on the surface. And their green depths were frigid with the cold hardness of ice.

"I'm mighty sorry to hear that, Don," Quinton said. "I find it hard to understand—"

Jo Weston brushed a soft blond hair out of her blue eyes. "It's just a marvelous chance for Don," she said. "But with the election coming up and all, we really feel that our place is here, at least for the present."

Jo Weston. What part was she playing in the invisible game?

Quinton stood up, nodding. "I see your point, of course," he said. "I won't overstay my welcome—but if you should happen to change your mind in the near future, just get in touch with us. We'll be glad to see you at any time."

"Thank you very much," said Donald Weston, his rather boyish face very earnest. "We'll certainly think it over."

I'll bet you will, thought Quinton. He said: "Well, thanks very much for the drink. Perhaps I'll see you around sometime."

"Perhaps," agreed Donald Weston, smiling.

Little man, what now?

Robert Quinton said good-by and walked out through the night to his copter, and death walked at his side.

"We've underestimated our man," Robert Quinton said slowly. "Weston didn't tumble for it, period."

"How much does he know, do you think?" asked Pat Conway, perched on the edge of the bed in Quinton's Galveston apartment.

"No telling; I can't read him. But Weston is a smart one, Pat, and so is that bombshell wife of his. We're not dealing with any pawn, and that's for sure. He must suspect something, or else why would he turn the offer down? We've got to watch our step, boy."

"I don't entirely get it, Bob," objected Conway, his thumbs hooked in his suspender straps. "It looks like this All-American Boy pose of his is strictly for the birds, but *why?* He can't possibly know he's the key pivot in a developing cultural situation, he hasn't done much of anything—or has he? What's he got to be afraid of?"

Quinton shrugged. "My guess would be that he's just plain old-fashioned smart. He's got big ideas, and he's playing the political game. This just-call-me-Don stuff is just about what you'd expect, after all. He's setting himself up as a regular Joe for the voters, that's all."

"It's more complex than that, I think," Conway said. "He's probably got his finger in some pies we haven't even smelled yet. He's no dope, and he'd have covered his tracks. Did you notice his eyes?"

"I noticed them," Quinton nodded.

There was a long silence.

"Nuts," Conway laughed shortly. "We're still gulping over the Evil Eye."

"Maybe," said Quinton. "Maybe we'd better be."

They had both seen "simple" situations blow up in their faces before. In this game, the rules changed while you played, and you changed with them—or else.

"Well, the next step is clear, anyhow," Conway said, breaking the uncomfortable silence.

"Unfortunately," Quinton agreed.

He was just getting to his feet to fix himself a drink when it happened. His scalp prickled and there was an explosive *poof*. Quinton dropped like a stone, twisted, and fired a chair at the wall switch. The lights went out.

He lay very still, hardly breathing, listening to his heart pound in his ears. There was silence, utter and complete. Quinton strained every muscle in his body, trying to hear. But there was nothing. Not a whisper. He waited a long time, wondering why he was still alive.

"Pat." His voice was very low. "Pat."

Silence. Quinton felt a sick dread wash through him. The killers were gone now, but he didn't want to turn on the lights. He didn't want to see. He tried again, without hope.

"Pat."

Nothing. Or—was that shallow breathing he heard in the room with him? Silently, Quinton wormed his way across the floor to the bed. He held his breath and felt ahead of him on the floor. Pat was there, and the floor was wet and sticky. Quinton let out his breath through set teeth. He felt sick and tired.

Quinton explored the body with a practiced hand, not daring to take a chance on the lights. There *was* a heartbeat, a faint one. The wound was in the chest, low on the right. That wasn't good, but it could have been worse. Pat was still breathing, but he wouldn't be for long. Not without help.

The hospital was out of the question. Quinton couldn't afford to get mixed up with a shooting at this stage of the game. There was just one thing to do.

He crawled over to the closet and fished the special wave radio out of its hiding place in the wall. Regulations or no regulations, he wasn't going to let Pat die if he could help it. He beamed New Mexico Station, setting the dials by means of a tiny red light in the set, and sent a code message: UNBAC IMPERATIVE OFFICIAL. CONTACT: BORDIE, NEW MEXICO STATION. CONWAY SHOT GET THE DOC AND COME A'RUNNIN'. REPEAT IMPERATIVE. QUINTON.

He lifted Conway's wet body carefully to the bed and dressed the wound as well as he could with his first-aid box. Conway moaned once and his

heartbeat remained faint. Quinton clenched his fists, the old hate trembling through his body.

If Pat died—

He sat down by the still figure on the bed, his gun in his hand, and listened to the shallow, fast breathing.

It was going to be a long night.

It was four o'clock in the morning when the doctor came, and he didn't come with Bordie. He came with Carr Siringo.

"Bordie was delayed," Siringo told Quinton, looking him in the eye as though daring him to challenge his word. "I had to come down this way anyhow, so I brought the doc."

Quinton ignored the words and accepted the facts. "Thanks, Carr," he said "I won't forget it."

Siringo plopped himself down in the kitchen and insisted on talking about the significance of banded clothing on Meran. At first, it irritated Quinton, but then he calmed down and even became interested in the ideas Siringo was sparking off with such brilliant nonchalance. Quinton's mind was sharp with early-morning clarity and he thrust and parried the rapier-like cuts from the short, bald man, trying grimly to hold his own.

It was after five when the doctor walked through the door and sat down on the kitchen table, and Quinton suddenly realized that Siringo had neatly and effectively been taking his mind off the still form in the next room. Quinton eyed him accusingly in the gray light of dawn, and Siringo returned his gaze imperturbably.

"Well, Doc?" Quinton asked.

The UNBAC doctor shrugged. "Maybe," he said.

"You'd better get some sleep, son," said Carr Siringo.

Robert Quinton hesitated, and abruptly discovered that he was exhausted. Something snapped way down deep, and told him he wasn't as young as he once was. His throat was dry and his eyes burned. He nodded slowly, left the room, and turned in.

He didn't look at the figure on the other bed.

Robert Quinton looked at the man sitting across from him and wanted to smash his face in. Instead, he smiled pleasantly.

"That's it, Pond," he said. "We've picked you for the job, and you can write your own ticket."

Wiley Carruthers Pond made pyramids with his smooth hands and listened intently. He had iron-gray hair and an aristocratic, noble face. He was forty years old, was liked by small children and babies, spoke loud and often of his service to the people, and was a first-class heel.

"I'm not sure I understand you, Mr. Quinton," he said.

"You don't have to understand, Pond. All you have to do is sit in for four years and collect twenty thousand

a year from us, plus your regular salary as Councilman. We'll get you elected, and no strings attached."

"It's most irregular, Mr. Quinton," Pond said, his eyes gleaming.

Quinton clenched his fists, thinking of Conway. He hated the guts of Wiley Carruthers Pond, a fact of no importance whatsoever. Pond had political connections in Galveston, and aside from that he didn't matter. Donald Weston did.

"Well?" Quinton said.

"After all, Mr. Quinton, a *Councilman*. Then, you're paying me—"

"Yes or no," Quinton said, his eyes hard. "I haven't got all day."

Pond eyed him narrowly. "Of course," he said, "my only interest is to help the people. If for some reason you feel that I could be of more service to them as a Councilman, then I must say that no position is too humble for service. No man can be too proud to serve, Mr. Quinton."

"Yes or no," Quinton repeated.

Pond leaned forward. "All I do is serve and keep quiet, and collect twenty thousand a year, right? You'll sign a contract assuring me that I won't be asked to act in any way contrary to my principles?"

"Of course," Quinton assured him. "You're in no danger. Our interest begins and ends with getting you elected."

Wiley Carruthers Pond stuck out his well-manicured hand. "It's a deal," he said. "May I say that I am grateful to you for your interest in the people of Galveston? It's men like you, Mr. Quinton, who—"

Quinton cut it as short as he could. He had played this scene before, too many times with too many people, to take any pleasure in it. He came to terms in a hurry, and walked away by himself. He felt like he needed a good bath.

Pat Conway was still alive, but he couldn't be moved. The doctor stayed on, and Quinton and Siringo played poker on the kitchen table.

That wasn't the only game they played.

Money was no object, and the men from UNBAC knew their stuff. What little they didn't know, Wiley Carruthers Pond and the local machine filled in with a vengeance.

Both Galveston papers announced Pond's candidacy on their front pages, and printed flattering, smiling pictures. Both Galveston papers began to run his life story of unselfish service to the people of Galveston, climaxed now by his decision to serve in a minor capacity where he could directly and intimately help the little people. At the same time, editorials were printed about Donald Weston that painted him as an unscrupulous political schemer, unfit to represent the people of the City of Oleanders.

Whenever one turned on the tri-di, there was the beaming, hearty, trustworthy Wiley Carruthers Pond, in-

dulging in heart-to-heart talks with the people. Viz phones rang all over the island, and the canned face and voice of Wiley Carruthers Pond assured the listeners that he was on *their* side, first, last, and always.

There was more, much more. There were whispering campaigns, clever and vicious political jokes, and slanted "news" stories. Weston's tri-di talks were edited, and commentators "interpreted" them with cutting sarcasm.

It was dirty, slimy, and ugly. It was the Big Leagues, and it made Quinton sick of himself and of the work he had to do.

It was rotten, clean through.

Robert Quinton paid out the easy money and talked with oily voices on the blacked-out viz phone. He got down in the dirt all day long, and at night he sat up and listened to Conway's shallow, gasping breathing in the next bed.

He talked to his soul.

Somehow, he had never imagined that it would be like this.

Robert Quinton had been born in 1994.

That meant that the first space station had been built and the Moon had been reached twenty years before his birth. It meant that the inner planets had been touched and a tentative colony set up on Venus ten years before his birth.

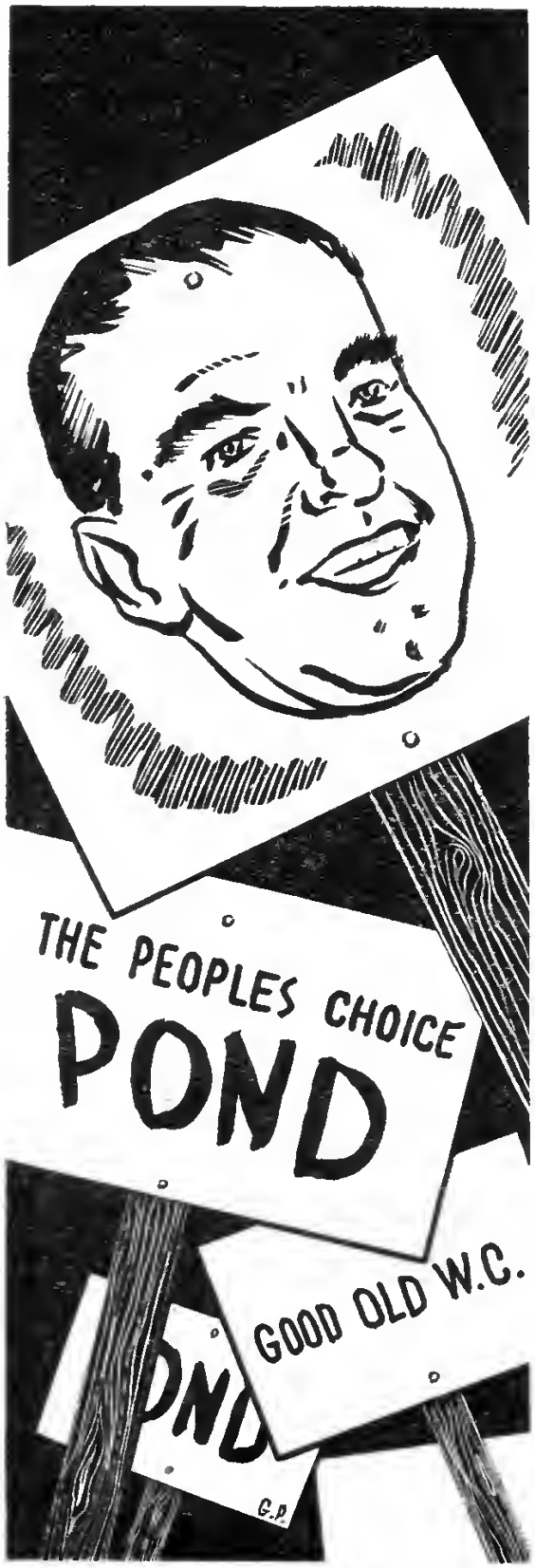
That meant that the United Nations, after half a century of bitter ups and downs, had gradually absorbed enough power to make itself an authority to be reckoned with in world affairs. The United Nations, of course, was an inevitable product of space expansion.

That meant that before he ever drew a breath the great solar energy stations had largely supplanted atomic energy as a cheap power source, and had brought tropical areas into positions of new importance as vast natural hothouses for the cultivation of the necessary plants.

In 1990, a practical interstellar drive had been found—and promptly hushed up as being too dangerous a toy for a still-unstable planet to play with thoughtlessly. That was four years before Robert Quinton was born.

That same year, Robert Quinton, Sr., a cattle rancher in New Mexico, had met Anne Torneson, his future bride, at a stock show. The senior Quinton had been born in 1954, and his wife in 1958.

When Quinton was a child, he hadn't been markedly different from other children of his age and time and place. He banged around the barn and got treed by a bull and watched the rockets flash by in the blue sky over his head. While the first genuine social science was coming to life after the ferreting out of the true interrelationships between psychology, anthropology, sociology, and economics, young Bob Quinton was discovering



how to pick up sleepy rattlesnakes by their tails and snap their heads off with a flick of his wrist—a practice not encouraged by his mother.

While Bob Quinton was losing sleep over traditional school baseball games, a vitally important principle began to dominate scientific thought. It was quite simple. It had been around for a long time in medicine and elsewhere. It had been succinctly stated by an old general of the '50s named Omar Bradley: "*The way to win an atomic war is to make certain it never starts.*"

The principle? It's tough, if not impossible, to cure a cultural disease such as war—but you can *prevent* them before they ever happen.

Preventive medicine—applied to cultures.

It wasn't that simple in practice; neat plans never are. Culture patterns had lagged desperately behind technological advances. In a world of atomic fission, politics were hardly out of the Feudal Ages. The course of civilization was still charted by "common sense" and "everybody knows" and "the natural way to do things." There were no legal channels through which wars could be prevented in the only way they *could* be prevented—and legal changes were incredibly slow with nuclear clouds on the horizons, based as they were upon prior decisions going all the way back to the Roman Empire.

The scientists had the solution.

Could they *use* it?

Their answer was, inevitably, a patchwork, makeshift system that operated undercover, in the shadows. They went to work, a selected few of them, to try to hold the world together until some sort of a balance was attained.

They were outlaws, of course. So was George Washington.

The survival probability curve, commonly known as the Snake, was developed by integrating the cybernetic computers with selected social data from all over the world. The curve was *not* designed to maintain the *status quo*, or to block progress in any form. It was not designed to "control" cultures or individuals in any particular direction. It was nonpolitical, without preference for any one faction or system, whether conservative, liberal, or in-between.

The Snake was concerned with exactly one item: the survival of free civilization. It was designed solely to enable the world to last long enough to work out its own problems in its own way. When the curve nosed down, it did not mean simply that a change was coming; that didn't matter. It meant that unless conditions were changed it was *finis* for Earth. Kaput.

The End.

The survival probability curve was built around one guiding principle: "Control" must be kept to an absolute minimum, and not utilized at all unless it were imperative for survival. All cultures must be allowed to develop in their own way, so long as they did not positively threaten the free existence of mankind. It was about as radical as the concept of liberty.

It was spraying the stagnant waters before the mosquitoes hatched.

Bob Quinton grew up exploring the forest preserves and the hills of New Mexico, wandering up the purple canyons and picking up beautifully chipped arrow points from the rocks. Had you asked him about man's problems, he would have wondered what was the matter with you. He wasn't interested, and he had more important things on his mind.

But he was hooked, nevertheless He was hooked from the day he found his first arrow point, read his first book, looked at the stars. He went fishing along the clean mountain streams, and he soaked up the sun. But new ideas were in the air—and Bob Quinton inevitably soaked up more than just Vitamin D.

By 2010, UN exploration ships had contacted Procyon and Centaurus. They had contacted four other systems as well—and the ships had never returned. The contacts were hushed up until a major war threatened between India and China, and then life on other worlds was announced.

Bob Quinton was fourteen years old.

The patchwork pattern of the self-styled "culture tinkers" took form. It took shape as UNBAC—the Business Advisory Council of the United Nations. BAC gave tips and planned developmental patterns for the commercial interests of Earth, and it got tax-free support funds. Most of UNBAC, the part the people saw, made itself extremely useful and had the reputation for being the only practical part of the UN.

The rest, the secret part, wasted its time on survival.

Bob Quinton went to college and majored in anthropology. He had fun and drank a lot of beer and married a classmate. The world was calm and pleasant for ten years, on the surface, and the belief was loudly proclaimed that a New Golden Age had arrived—the date of the first one being tactfully not mentioned.

He saw a lot of the world, and a lot of other worlds. He went up fast and he grew up fast. In some dimly-perceived but acute way, Bob Quinton felt that a lot of things depended on him, and upon men like him. He seldom talked about them, and when others did he usually felt uncomfortable and bored. The obvious didn't need elaboration. But he felt them.

In the silence of space.

In the stars in the eyes of a child.

It should have been dashing, romantic. There should have been bands playing and medals and people cheering. It should have been a richly rewarding and pleasant life.

But it wasn't.

It was tough and dirty and bitter.

So Robert Quinton worked on, in the late summer of 2034, in the island city of Galveston. Few people even knew he was there, and fewer still cared. He did things he hated and saw a friend cut down before his eyes.

He worked, fists clenched, a smile on his face. He worked, and when he was through the average citizen could not have told Wiley Carruthers Pond from Thomas Jefferson.

Or Donald Weston from the Devil.

They flew Conway, still alive, back to New Mexico Station and left Robert Quinton alone in his apartment. That same night, Jo Weston came to see him.

She walked in quietly, out of the darkness. She slipped off her light summer jacket and sat down in Quinton's best chair. She crossed her astonishing legs and eyed him questioningly.

"Drink?" she asked, in a voice that was cold honey.

Quinton nodded, unsurprised. "Guess I owe you one or two," he said. It wasn't a particularly original remark, but he didn't care. This, too, was a scene he had played too many times before. It was getting more than a little stale. He mixed her a stiff Scotch and soda, took one himself, and waited.

"I don't understand you, Mr. Quin-

ton," Jo said finally.

"Call me Bob," Quinton said.

Jo smiled, her teeth white and sharp. Her golden blond hair caught the soft highlights of the room and her blue lips invited.

"You're out to get my husband," Jo said steadily. "Why?"

"I don't know what you're talking about," Quinton said. He looked into her frosted blue eyes. *She knows*, his mind whispered. *She has to know.*

"Don't lie to me, Bob," Jo said softly. "Another drink?"

Quinton fixed it for her, and watched the slight flush creep up her smooth neck while she drank. *A flush*, he thought irrelevantly, *is caused by blood. There was more blood right across from where she sat, just a dark spot on the rug now. Pat's blood.* Quinton lit a cigarette.

"Bob," Jo whispered, "I want you to stop it."

Quinton looked at her. "I love my wife," he said evenly.

Jo stiffened, her smile vanishing. "Don't play games, hero," she said quietly. "I'm not kidding."

"Neither am I," Quinton said.

They stared at each other. Quinton would have bet a small fortune, had he had one, that Jo could have counted the times men had said no to her without using any fingers at all.

"I . . . I don't understand," she whispered. She began to cry, softly.

"That isn't worthy of you, beautiful," Quinton said. "It won't work."

The crying stopped.

"Fix me another drink, lover," Jo said.

Quinton walked into the kitchen and mixed the drink. When he came back into the room he looked down the muzzle of a small pistol held in Jo's white hand.

"You drink it, lover," Jo said. "You're going to need it."

Quinton sat down and sipped at the Scotch. He didn't say anything. He was calm, relaxed. He had played this scene before, too.

"You're going. to take the heat off," Jo Weston said, the gun steady in her hand. "You can play this little game any way you want to play it, but the pressure's going to stop. You're leaving town, hero—one way or the other."

Quinton raised his eyebrows.

"You don't think I'd kill you," Jo said coldly.

She fired with startling quickness and a slug slammed past Quinton's ear and buried itself in the chair. He jumped, spilling some of his drink. He hadn't expected that.

"I think you would," he said, "if you could."

The tiny Skippy from Quinton's sleeve spring leaped into his right hand and he fired instantly, without seeming to aim. There was a light *poof* and Jo dropped her gun. Her hand had a sliver of silver needle through it. Her fingers were dead. She didn't make a sound.

"Sorry, baby," Quinton said, and meant it.

He went to her, scooped up the gun, and led her to the kitchen. He pulled out the needle with a practiced hand, washed the wound, and dressed it with the same kit he had used on Pat. Then he led her back into the living room.

Jo just looked at him, her blue eyes tight with pain.

"Here," Quinton said, handing her the rest of the drink. "You'll be able to use this."

Jo tensed her slim figure, breathing hard. She smiled icily and threw the drink in his face. Then she turned on her heel and walked out the door.

Quinton wiped his dripping face with his handkerchief and watched her go. She hurried down the dark street alone, her heels clicking on the pavement. Her head was up, proudly.

A factor, Quinton thought, *a number in an equation?*

Or only a woman in love with her man?

Quinton watched her until she passed out of sight. She was both, of course—but that was words. What good were words?

He walked back into his apartment and closed the door.

When it was all over, Quinton didn't wait for the final returns. The election itself hadn't been too much of a problem—such things had been arranged on Earth long before UNBAC had come into being. Quinton didn't bother with Pond; they were through with him, except for the money.

He went out to the Weston home, out by the causeway where the old men still sat fishing in the afternoon sun.

Jo opened the door. "What are you doing here?" she asked coldly. "Get out."

"Let him in," Donald Weston said over her shoulder. "Let him in, you fool."

Jo stepped aside and Quinton walked in. The living room was just as he had left it. The volume from the *Reader's Digest* was still ajar in the bookcase. But Donald Weston had changed. Quinton sat down and lit a cigarette. He didn't look at Jo's eyes.

"A tough break about the election," he said. "I was sorry to hear it, Don."

Donald Weston smiled, but only with his mouth. His deep green eyes bored through Quinton like an ice drill. Quinton felt centipedes crawling up his spine.

"Our offer is still open, Don," he said pleasantly. "How about it?"

Donald Weston sat down, his face blank, his straw-colored hair neatly combed as always. He was breathing too fast. "Suppose I say no," he said, his voice a little too high. "Suppose I decide to stay here."

Quinton took a drag on his cigarette, feeling death all around him in the little room. "I wouldn't know about

that," he said. "The decision, of course, is up to you."

"Is it?" Weston asked, his voice tightly under control. "*Is it?*"

Quinton shrugged.

"Still playing games, Mr. Quinton?" Jo asked. Her hand curled tensely on her chair arm, making her white scar stand out against her white skin.

Quinton smoked his cigarette. *She might have been queen of the world*, he thought.

"Cards on the table, Quinton," Donald Weston said. His green eyes were narrowed to slits. "Quickly."

"I don't know what you're talking about," Quinton said.

Donald Weston stood up, fast.

"Let's put it this way," Quinton went on, every nerve alert and screaming. "I don't think you'd do very well on Earth, Don. You never would be able to do yourself justice. On the other hand, we can use you on Mars. Our company can always use men like you. You'd be comfortable there, and you'd get considerably more than your share of things. We'd want you to be happy, you understand. On Mars, you'd be set for life—although, of course, it wouldn't be feasible for you to come back to Earth. If you should stay here . . . well, it's a gamble, isn't it?"

Weston clenched his fists, breathing hard. "I don't have any choice," he said flatly, keeping a steel vice on his voice. "Is that it?"

"I'm afraid I don't quite understand you," Quinton said, listening to the blood race in his ears. "I'm just offering you a job, that's all."

Weston stared.

Jo laughed, unpleasantly.

Quinton waited, his cigarette burning down short against his fingers.

There was a long silence, filled with the hoarse breathing of the man who had called Robert Quinton light-years across the galaxy.

"I'll take your job," Weston said finally. "I'll take it."

Robert Quinton smiled broadly and inserted his cigarette butt into the ashdisposer. "Mighty glad to hear that, Don," he said, getting to his feet and extending his hand.

Weston ignored the hand. "When do I leave?" he asked shortly.

"I think tomorrow would be excellent," Quinton told him.

"One time's as good as another," Weston said. A small muscle twitched in the side of his jaw.

"Fine. If you'll drop by my office in the morning, we'll fix things up. A ship will shuttle you to New York tomorrow afternoon, and by ten tomorrow night you'll be Marsbound."

Jo sat very still, her eyes closed.

"I'd like to say, Don," Quinton said, "that I think you've made a very wise decision. We'll do the best we can for you, and that's straight."

"Get out of here," Donald Weston whispered, his voice shaking. "*Get out of here.*"

"See you in the morning, then," Quinton said. "Good afternoon, Mrs. Weston."

He walked out the door and headed for his copter. He was wet with sweat and he needed a drink. This was all wrong, he knew that. He had seen worlds saved before, on the tri-di. He had read books. He had had his own dreams. Worlds were saved by heroes, in a blaze of glory, saved cleanly out among the stars, man to man.

Not like this.

Not by an old man, down in the dirt, cold with sweat.

He walked to his copter and he didn't look back. He didn't have to. He felt them behind him, boring into him. *Eyes*. Icy green eyes, and blue ones lined with red. Eyes that had looked upon a world—full, deep eyes.

Empty, now.

It was the next night, and the lights were low.

The election had caused some local flurry, but not much. No one even knew that Donald Weston was gone. The post-election remarks of Wiley Carruthers Pond were back on the second page of the Galveston *Daily News*, the big headlines having gone to the space games. It all was moderately interesting to native Galvestonians, but not exactly hot copy now that it was over. The wire services, of course, didn't even bother to pick it up.

The music throbbed across the dance floor, and Lynn was in the silver gown he liked so well. In Quinton's pocket was a gram from Siringo that told him that Conway was improving, and had a chance to live.

"This is nice," Quinton said, holding his wife's hand across the little table.

Lynn smiled at him—the private smile. "We'll never grow up," she said. "We should be past this stage by now."

"We're too smart," Quinton said. "We know better."

A ship flashed by overhead—only a rumble and a murmur in the night outside. You could hardly hear it over the music. Quinton closed his eyes, watching the ship in his mind. He saw it climb past the planets, out to the crystal stars. To far Centaurus and to Procyon beyond.

The stars called to him, and one day he knew he would have to answer them again.

But this was for now.

He looked around him, at the soft lights, the dancers. He heard the tinkling of glasses and the relaxed laughter of men at play. They didn't know. They had never felt the stars burning inside them. For them, there was only the night and the whispers and the music.

For Robert Quinton, too—for now.

He stood up, smiling. "Let's dance," he said, and held out his arms to his wife.

THE END

FAMILY RESEMBLANCE

BY ALAN E. NOURSE

For the non-embryologist among the readers: the facts stated relative to the Suidae *are quite correct. It is also true that a man forced to look in one direction for a long time loves to take a sly side-look!*

Illustrated by Pawelka

It really started off as a prank, as so many things do, and it would have remained a prank if Dr. Herman Tally hadn't happened into the hospital nursery at precisely the moment he did—or if he hadn't had a fight with Dr. Hogan just before, which worked his mind into fertile ground for the seed to fall. And there wouldn't have *been* even a prank if it hadn't been Tuesday, and if Miss Henderson had been somewhat less inclined to squeal when excited.

But it *was* Tuesday, in the early summer of 1955, when life for a hospital interne was reaching its nadir, and many a fledgling doctor, like Dr. Barret, for instance, was practically driven to schemes to relieve the humdrum routine of patients and case histories. A most unimaginative cook was really to blame, for the three doctors were sitting about the internes' table at St. Christopher's Hospital that day, eating the inevitable Tuesday fare of pig-in-blanket and sauerkraut, and wondering dully what to discuss next.

"What," said Dr. Barret, in a moment of inspiration, viewing his dinner plate, "makes more noise than a pig under a gate?"

"Two pigs," muttered Dr. Hines, munching thoughtfully. "Or three pigs under a blanket. You're out of date."

"Oh, no," smiled Dr. Barret, the faintest gleam in his young hazel eyes. "For your information the answer is: Miss Henderson, when

she's suffered an emotional shock!"

Miss Henderson, the newest proby nurse at St. Christopher's, was at present assigned to uneasy duty with Dr. Barret on the maternity ward, and had suffered numerous emotional shocks, it seemed, under that gentleman's tender care. Miss Henderson was, as they put it, a lush dish; she was also not too bright.

Dr. Barret chuckled in unashamed malice. "You should have heard her," he grinned, "when she spotted that wiggly green lizard jiggling down my jacket front the other day. She squealed like five pigs under a gate!" The doctors laughed, and leaned closer to Dr. Barret, sensing a scheme under construction. "Now, Miss Henderson is in the nursery this afternoon," he speculated softly. "What do you suppose she would do if she found—"

It was very simple to arrange. Dr. Barret took a quick trip across the campus to the Agricultural Experiment Station after lunch, and returned to the hospital as unobtrusively as possible through a rear entrance, hoping that none of the staff would notice the odd bulge under his interne's jacket. Five minutes later he exhibited his prize to his fellow conspirators in their rooms, where they scrubbed it with soap and water and sprinkled it liberally with baby powder, amid much outraged squealing, until the barest whiff of chloroform sedated it into a snuffling and uneasy sleep. Then the other two internes waylaid Miss Henderson, giggling and self-conscious, in the chart room while Dr. Barret placed the prize in a baby-basket in the nursery, neatly wrapping it in a blue baby blanket, and arranging it between the basket tagged "Child Harrison" and the one labeled "Child Wojikowsky." He left it there with a small but distinctly legible tag at the bottom of the basket: "Child Porker."

The three were watching from the nursery door, maintaining a studied and valiant calm, when Miss Henderson, still giggling and meditating future dates with handsome doctors, marched into the nursery with the two-o'clock bottles for Child Harrison and Child Wojikowsky. Her reaction was gratifying indeed. She stopped in her tracks, let out the prize squeal of her eighteen years, and fainted dead away.

It would have remained a prank if at precisely that moment Dr. Herman Tally, Professor of Anthropology, student of infant development, and chief whipping-boy of Dr. Hogan's anthropological research staff, had not made his weekly rounds of St. Christopher's nursery. Dr. Tally was essentially a mild man, calmly gratified if his daily routine was allowed to run its course without too many ragged edges, from rising in the morning to retiring at night. He was decidedly *not* mentally prepared for three startled internes,


tears. "If you're going to turn in-
to a pig, my dear," said Alice, seriously, "I'll have noth-
ing more to do with you. Mind now!"
G.P.

a bewildered nurse, and the apparition in the baby basket as he climbed the nursery stairs that afternoon.

He was muttering to himself at the most recent indignities suffered at the hands of his chief. The lazy pig! It wasn't enough that Dr. Hogan required him to type, rewrite, proofread, index, and play public relations supervisor for the Book—he had to collect the man's research data for him, too, when Dr. Hogan didn't feel like hoisting his porcine bulk down to St. Christopher's nursery on a hot Tuesday afternoon. Dr. Tally sighed tiredly. For three years now the Book had occupied the entire working hours of the whole anthropology staff.

"'Back to the Apes,'" Dr. Hogan would beam, expounding enthusiastically, "will be the last word on the Origin of Man conflict—the *last word*, I say, the crowning blow to all opposing theories!" He would puff and wheeze, then, smiling his fat smile beneficently upon anyone who was still listening. "The final work will be published in 'Back to the Apes,' proving, I say *proving* that Man and Ape alike can smile back on a common ancestor!" And then he would beam some more.

Dr. Tally grimaced. He was so tired of going back to the apes. The title wasn't even Dr. Hogan's idea, and some of the harebrained ideas that *were* his, like these recent tests on infant reactions—Dr. Tally reached the top of the stairs unenthusiastically, and walked into the nursery.

Miss Henderson was already enjoying the solicitous attention of the three young internes, so Dr. Tally looked immediately for the cause of her sudden collapse, and the squeal he had heard clear down the stairs. The sight of the basket took him quite aback. For a moment he stared at it in disbelief, until in a flash of insight he recognized all the earmarks of an interne's sense of humor. Nevertheless, he still stared at the basket. And stared, and stared.

The idea trickled into his mind, almost frightening him. Something there struck a chord, a beautiful harmony, far back in his memory. Some resemblance to something he had seen, or read—he ran a trembling hand through his sparse hair as he thought, probing the vast store of incidental and disorganized material in his mind. There had been so much to learn in anatomy, or physiology—or was it embryology? The more he studied Child Porker, snuffling in its basket, the stronger the idea became, forcing itself into his mind, carrying him closer and closer to the familiar link—

Embryology! That was it! His heart was suddenly beating in his throat, and he jammed his hat on his head, beating a hasty retreat down the stairs. Embryology! Out of the depths of his mind, he knew excitedly, there was something about embryology. If he could only find the book—

Dr. Tally was late for supper, and when he came up the walk from his battered Chevvy, arms loaded with books, he viewed dinner with a certain degree of abstraction. It had been embryology, indeed, and much, much more. The afternoon had been spent in the library stacks, checking first one embryology text, then another. It was after an hour there that he grew certain that he had a trail to follow, but a complex trail, with many devious twistings. It took him into anatomy, into physiology, into biochemistry—He kissed his wife, hardly seeing her, and settled down to his belated supper, opening Benson's "Parasitology" on one side of his plate, and Best and Taylor's "Physiological Basis for Medical Practice" on the other side. In a matter of moments he was immersed, his thin shoulders trembling with agitation.

"Dear," said Mrs. Tally, hopefully, "are you enjoying your chops? They're very expensive, nowadays."

"Chops?"

"Pork chops. What you're eating. Aren't they delicious?"

He looked up from his books, first at his wife, then at the chops, his face slightly green. "My dear," he said, pushing his plate away gently but with finality, "I'm afraid I just can't enjoy the . . . dinner . . . this evening. I've a great deal of work to do, and I'd like to be undisturbed tonight." He rose unsteadily from the table, books under his arm, and beat a hasty retreat into his study.

The trail was unmistakable, clear and distinct. For years people had nodded sagely and accepted authority unchallenged, even when they had walked past the trail in a dozen places. It was here, winding its way through a dozen books, never examined, never correlated—but here! Anyone with half an eye could find it. They had just missed it because they hadn't dared to look. And all the palaver about scientific method! He pored over the "Parasitology," then checked several chapters of human physiology. Darwin's "Origin of the Species" came next, then the embryology again and a huge text on dental surgery. Three large tomes on psychological conditioning and reflex reactions occupied him for almost an hour before he tossed them aside with a sigh and sought out a chapter on human nasal surgery. All here, all so clear—and nobody had thought to make the necessary correlation! His heart was in his throat, his whole mind afire with the expanse of his vision when his wife brought in a sandwich and milk, well past midnight. And she saw a gleam in her husband's eye that she hadn't seen in ten years under Dr. Hogan's tyranny.

"Darling," said Dr. Tally, after munching for a while on the sandwich, "how would you like to go away for a while—take an extended vacation, for instance?"

"Go away?" She looked up in sur-

prise. "Why, Herman! We haven't been on a vacation in ten years! Where to?"

A faraway look came into the doctor's eyes. "Some beautiful island, maybe in the South Pacific. Maybe we could go to New Zealand, or Central Africa. I hear they need anthropologists in Central Africa—"

Her eyes were wide, and she brushed back her graying hair with studied care. "Herman, you aren't yourself tonight. What's wrong? Are you in trouble?"

He stood up, swelling his thin chest with air. "The biggest trouble in ten years, my dear, and the most wonderful! I've found something that may lose me my job so fast I won't know what hit me!"

"Something that will oppose Dr. Hogan?"

"Oppose him! It'll knock him and his theories right out the door. And it'll get me fired on the spot. The Board of Trustees may throw me out on my ear, if I can't convince them, but I'm going to do it if they put me on a spit and roast me! The great Dr. Hogan has been rooting in my cornfield for years—and now I've got a stick big enough to drive him out!"

Dr. Horace Hogan's office was the largest, brightest, best equipped office-lab in the Zoology Building. His first book, "The Essence of the Ape," had given him the laboratory, and the prestige, and the power over his subordinates, as well as altogether too much to eat in the past five years or so. He hoisted his blubbery bulk around in the swivel chair to face Dr. Tally, his fat red face heavy with annoyance.

"Yes, yes, Dr. Tally—what is it? You know I'm not to be disturbed when I'm writing."

"Dr. Hogan, I have a question to ask you." Dr. Tally's face was drawn tight, a cold light of determination in his eyes. He wondered, abstractedly, how Dr. Hogan would look roasted, with an apple in his mouth.

"Well, you'll have to see me later. 'Back to the Apes' comes first in this office, you know. I've a deadline to make."

"Bother the deadline," said Dr. Tally succinctly. "You won't need to make it. And I want my question answered here"—he drew himself up straight and proud—"and now!"

The fat man spluttered and swung back to face him. "All right," he said testily. "Out with it, man. What's the trouble?"

"What is the complete biological classification of Man?"

Dr. Hogan's face went blank with surprise. "Chordata, Craniata, Mammalia, Primata, Hominidae, Homo sapiens," he snapped mechanically. "Our freshman pre-medics were asked that question on their first-hour quiz, Dr. Tally."

"Yes," said Dr. Tally softly. "I suppose they were also asked to trace

the human evolutionary chain back to a common ancestor with the apes, weren't they?"

"Of course they were! That is undoubtedly the most precious and fundamental single item of knowledge they will ever have occasion to encounter!" The fat man quivered, his face red.

Dr. Tally sniggered audibly. "But if they give *your* answer, they might be all wrong!"

"*Dr. Tally!*" Dr. Hogan started to get to his feet, thought better of it, and assumed a pose of militant indignation from a sitting position. "Such a remark is heresy, Dr. Tally. Rank heresy!"

Dr. Tally pulled a sheaf of papers from his briefcase. "Listen to me for a moment, Dr. Hogan, and correct me if I'm wrong. In tracing the evolutionary line of any creature, we look to generalized rather than specialized forms, isn't that right? And for that reason we consider Man from the point of view of the biological family, Hominidae, rather than the specialized genus and species Homo sapiens."

"That's right."

"And we look to the ancestral form with similar generalized characteristics when we want to find the progenitor of Man?"

"Of course. You know that."

"And are you wholeheartedly satisfied that Man's evolutionary root was unquestionably of the Tarsius family, now represented by certain monkeys and apes?"

Dr. Hogan wheezed in agitation. "For the dignity of Man, I am inalterably convinced, Dr. Tally. 'Back to the Apes,' I always say. All the evidence points—"

"Not *all* the evidence, Dr. Hogan! The evidence found in anthropology, perhaps, and paleontology—but there are other lines of evidence, modern evidence, unmistakable evidence. You can't twist scientific methods around a pole to suit your whims! There is evidence that does not point to Tarsius or the apes at all. It points directly and unmistakably to the *Suidae!*"

Dr. Hogan gasped, his hoglike jowls bobbing up and down. "Preposterous!" he gasped. "Of course there may be certain faint resemblances, but to relate human beings—*human beings*, mind you, to *PIGS*—"

Dr. Tally grinned a wicked grin. "There certainly are resemblances. Your evidence for the apes is anthropological, paleontological—but I have anatomical, physiological, and embryological evidence." He settled down in a chair. "Look at the evidence, Dr. Hogan. I remembered, from back in my college days, that somebody had once remarked, during an embryology course, that we studied the embryos of pigs rather than human beings, because they were more easily available, and *essentially the same!* I checked it. They are indubitably the same, Dr. Hogan, in almost

every way. Only in the last few weeks of gestation does a pig embryo become distinguishable from a human embryo. And after birth, what anatomical relation is there? The organs, the viscera, the internal arrangement of the pig is *practically identical* with that of Man! The same size, placement, shape, function, for all the organs. The apes present a very different anatomical picture. Both men and pigs have similar vermiform appendixes—apes do not. Human teeth have either one root or two in the premolars and molars, while in monkeys and apes these same teeth have three roots. In pigs these teeth are rooted the same as in man. And other things —men and pigs have little or no vestigial tails, while apes and monkeys have either short or long tails. Men and pigs are essentially hairless; monkeys and apes, even up to the gorillas, all have hair in abundance—"

Dr. Hogan's face was turning a dangerous vermilion hue, his eyes bulging from their sockets. "Superficialities!" he hissed, wiping his forehead with a pudgy hand. "Of all the impertinent, disgraceful ideas—"

"But there are other 'superficialities,'" Dr. Tally cut in. "Pigs and men have cartilage all around their noses, while monkeys and apes have slit noses. Pigs and men have that odd bit of useless tissue, the uvula, tacked on to the back of their palates, while there is little or no uvula among monkeys and apes. These are superficialities, of course, but doesn't science demand attention to little things? Now—"

"Preposterous!" sputtered Dr. Hogan.

". . . Now, let's go a little deeper. How about parasites? Ever hear of Trichina? Or Macracanthorynchus, and other hook-headed worms? What mammalian forms do these parasites attack? Man and pig, but never apes and monkeys. How about serological comparisons—blood serum and cells, and the like? Man stands no farther serologically from pigs than from apes —I could go on for hours, Dr. Hogan, but there's one comparison that puts the clincher on the whole thing. We've talked about paleontology and anatomy and physiology—how about *psychology?*"

"Well, *what* about psychology?" roared Dr. Hogan, his whole body trembling.

A sly smile appeared on Dr. Tally's face. "Why are pigs used for conditioning experiments now, in preference to rats and dogs and cats? *Because they react more like Man.* The pig stands far above cats and dogs and rats and many monkeys on the intelligence scale. And what other animal, Dr. Hogan, besides man, is so consistently lazy, gluttonous, dirty, selfish, treacherous, or pugnacious?"

Dr. Hogan was not merely sitting in his chair, he was fairly quivering, his round fat face damp with small beads of perspiration. "You . . .

you'd never dare to publish such a thing!" he said in a hoarse whisper. "What would it do to our culture? What would people think, what would they say? They'd never believe it or accept it. We'd have to rearrange our entire thinking processes, our philosophical values. It would throw the world into chaos, Dr. Tally—why, you'd have almost every religious group in the country down on our necks."

Dr. Tally was smiling. "And I might, just possibly, make people wonder if Horace Hogan isn't just a bit of a goat with his 'Back to the Apes' theory, mightn't I?"

Dr. Hogan purpled, his voice laboring under the strain of civility. "Now, Herman, we've been friends for years —associates in our work—almost brothers, you might say," he wheezed, his little pig eyes watching Tally shrewdly. "I know you wouldn't want to discredit me, who has done so much for you, and I *know* you wouldn't want to start any such storm as this. Now, I could make you an Associate Professor, and see that you get a substantial raise in salary—"

Dr. Tally shook his head, grinning widely. "There's something I'd much rather do," he said. "I'd rather see Horace Hogan grow thin—with worry, perhaps. You can't talk me out of it, Horace. I'm going to put the skids under that book of yours."

This time the fat man did hoist himself out of his seat, his face deep purple. "Traitor!" he screamed. "Ingrate! Get out! You're fired. Get out! Do your worst! But you won't get anywhere. The Board of Trustees will throw you out on your ear, and you'll be the laughingstock of the scholarly world. Pigs, indeed!" Frantically he fumbled for a telephone, his face apopletic. "I'll call the Board right now, and you'll be through—"

Dr. Tally coughed gently. "Dr. Hogan. You won't have to call the Board. As a matter of fact, they're waiting out in the office right now. I've already told them, you see, and they're—interested. Yes, you might say they're interested, and I've taken the liberty to arrange a little tour for them. Over at St. Christopher's Hospital—"

They were five elderly gentlemen. All five were tall, and all were lean, with narrow hawk noses and stooped shoulders, and sharp blue eyes peering disapprovingly at Dr. Horace Hogan as they made their way up the stairs to the hospital nursery. Dr. Hogan waddled ahead of them, panting and spluttering, for all the world like an overfed sow routed from her wallow. His pudgy face was damp, and his hands trembled as he worked his way up the steps, stopping periodically to pant a few spluttered words of protest. "Pigs! Can you imagine, gentlemen, the temerity of this man —"

"Yes, yes, Dr. Hogan, but if, as he

says, there is some reason to believe—"

"Preposterous! My work has been most scientific, there have been no loopholes. All the important evidence points—"

One of the elderly gentlemen looked down his lean nose at Dr. Hogan. "But surely a man with your acquaintance with scientific methods should be willing at least to listen!"

Dr. Tally sprinted up the stairs ahead of them, his face pale, lines of worry on his forehead. At the top of the stairs he showed the men to seats in the anteroom. "If you'll just be seated, gentlemen, I'll check to make sure we aren't disturbing feeding—" He disappeared through a white-painted door, and almost collided with Dr. Barret.

The interne looked up, and grabbed at Dr. Tally's sleeve nervously. "Look, Doc—that's the Board of Trustees out there! They hire and fire around here! You didn't tell me it would be *them* when you called this morning—you just said some old fogies—"

Dr. Tally nodded his head vigorously. "You've got everything arranged?"

The interne looked worriedly over his shoulder. "Sure, everything's just like you said, but you'll never get away with it–

"I've *got* to get away with it! I've planted the seed in fertile minds, and they'll see what they want to see. And particularly, they'll see Horace Hogan —" He patted the interne nervously on the arm and hurried back to the waiting room. "Now, gentlemen, if you'll just come with me."

Slowly they walked through the door and down the darkened corridor, past the viewing windows, to the very last room. The five members of the Board and Dr. Hogan filed up to the window and looked in, and silence fell abruptly over the party.

Inside, a subdued Miss Henderson moved efficiently from basket to basket, gently turning back the pink and blue blankets—

"What—"

"Impossible! Why, if I didn't see it with my own eyes—"

"There *is* a resemblance! Unmistakable! Why, how could this have been missed all these years? Dr. Tally, this is the most remarkable—"

Suddenly in the corridor there was a choked roar of anguish and despair, ending in a little gurgle and a heavy thud. This time Dr. Hogan fainted dead away. The elderly men looked around in alarm as several overnervous internes appeared to ease Hogan's bulk onto a stretcher and start work resuscitating him, and Dr. Tally herded his charges gently out into the bright light of the anteroom once again.

"Basically unstable," he whispered, jerking a thumb over his shoulder. "Couldn't bear to have his ideas refuted. But I'm sure you can see, gentlemen, that here is something worthy of careful investigation."

The five elderly gentlemen looked at each other, and back at Dr. Tally, and suddenly there appeared five broad and understanding smiles. "Yes, Dr. Tally. We're quite sure."

"What I can't see," said Dr. Barret later, as Dr. Tally helped him lug the heavy, squealing crates back toward the Agricultural Experiment Station, "is how you can reconcile this sort of thing with the 'scientific method' you're always yapping about. So maybe men came from pigs—it seems quite possible—but this is a funny way to prove it."

"Oh, it's *quite* possible. But this wasn't supposed to prove anything at all, really. Merely to give me a chance to try. We won't be bothered by Dr. Hogan and his wretched book any more." Dr. Tally turned twinkling eyes toward the young interne. "Though I'm afraid my methods of convincing would have insulted one of the greatest minds Man has ever turned out—the very father of the scientific method."

Dr. Barret looked up sharply. "You mean—"

Dr. Tally nodded apologetically. "Roger Bacon," he said.

THE END

THE ANALYTICAL LABORATORY

You are most earnestly invited to send in your votes on the stories in this issue—both I as the editor, and the authors are decidedly interested. Beginning with the stories in this April issue, the stories which are voted tops by reader opinion will get Astounding's one cent a word bonus; if an author does a top notch job, your applause will have the effect of doing him a real favor in return for the favor he's done you by giving you some genuine pleasure.

A simple postal card listing the stories in order of your preference is all that's necessary. More detailed comments are naturally appreciated. I can't print all the letters in Brass Tacks, but the trend of your likes and dislikes will be passed on to the authors. They need to know what you like, what you don't like, and the general reasons for your approval or disapproval. Only so can they do a better job.

Here's the January issue score box:

Place	*Story*	*Author*	
1.	Un-Man	Poul Anderson	1.60
2.	The Captives	Julian Chain	2.72
3.	Secret	Lee Cahn	2.85
4.	These Shall Not Be Lost	Everett B. Cole	3.43
5.	Stamp From Moscow	Steve Benedict	4.11

THE EDITOR.

THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

SCIENCE FICTION AND FICTITIOUS SCIENCE

As the general public cautiously samples this novel stuff dubbed "science fiction," there is an understandable confusion over the borderline between science fiction and what used to be called pseudoscience.

This confusion is not helped by some of the concepts which pass under the name of science in present-day science fiction. The initiated reader, who has more or less grown up with the field, is not greatly bothered by heroes who have two brains, are in two places at once, read minds, teleport heroines out of the path of ravening BEM's, and otherwise enjoy the powers which used to be associated with fairy princes. But John Q. Public is, and has every right to be.

The muddle is one which developed about the time science fiction became self-conscious and has intensified with its struggles to become adult. The oldtimers of the nineteenth and early twentieth centuries—except possibly for Jules Verne—were not greatly concerned with the teaching value of their stories. I doubt that H. G. Wells believed in the possibility of Cavorite or death rays. Edgar Rice Burroughs would certainly never have written serious articles to prove that Mars was covered with red plush and beautiful women.

But as even more daring fantasies began to appear, side by side with stories hung on some actual scientific fact or hypothesis, in the pages of Hugo Gernsback's popular science magazines, and as the latter from time to time gave space to scientific "theories" about as farfetched as some which were presented as fact in the Hearst Sunday magazine and other week-end supplements, small wonder that the two—science fiction and pseudoscience—became associated in the minds of teachers, librarians, scientists, and the general public.

For a while there was a studied attempt to persuade these good folk that science fiction had real teaching value. There were science quizzes in *Amazing Stories* and other of the early magazines. Any story based on a hitherto unused scientific fact or hypothesis was almost certain to be accepted and ballyhooed, whether it had literary merit or not. Such stories were notable for the large, undigested—and often undigestible—masses of exposition used to stop the action in its tracks at frequent intervals.

Science fiction built around known science will, I hope, always be with us, but it grows progressively harder to write. A fine writer will always be able to derive an emotional response from a description of what happens in weightlessness or the experiences of the first man on the Moon. (He will go right on doing it, even after these things take on the guise of historical fiction.) Robert Heinlein is perhaps our best example of such a writer: one who can make his science water-tight, essential to the plot, yet wholly unobtrusive.

Run-of-the-mill stories by run-of-the-mill writers have "outgrown" factual science of this sort. There is no longer enough novelty—enough challenge to the imagination—in the simple ideas and situations which once thrilled science fiction fans. And so we have our modern science fiction of extrapolation and extra-extrapolation, in which the house rules have become: name a situation or a concept and take off. (Under this philosophy of science fiction, Kendell F. Crossen can write a guest editorial for *Startling Stories* with the advice: "Throw the science out of science fiction." To do him justice, his second tenet is: "Say something.")

Here again we have a source of confusion for the uninformed neophyte in science fiction, for there may be a great deal of similarity between the "science" assumed as axiomatic by current science fiction and that advanced as factual by various pseudoscientific cults. I can recall no stories based on Velikovsky's ideas per se, but there have been plenty, from Verne's "Hector Servadac" on down, about comets which brushed the Earth; Atlantis has been one of the oldest postulates in one kind of science fiction, and "lost" super-races of the remote past are quite as common;

telepathy, psychokinesis, and assorted other extrasensory psychic powers are accepted with open arms by readers who will snarl down ghost stories as "fantasy."

"In the Name of Science," by Martin Gardner—G. P. Putnam's Sons, New York. 1952. 320 pp. $4.00—is a running account of some of the quackpot brands of alleged science which have been espoused by fair-sized sectors of the public in recent times. A few of the cults he describes may have been hoaxes, foisted on the gullible by scoundrels for power, profit, or a practical joke; most of them, however, seem to have been believed as strongly by their authors as by their disciples.

Not every reader of Mr. Gardner's mocking account will agree that all his targets deserve the shotgun fire he turns on them. (All of us, I suppose, have blind spots about these things—things we'd like to believe are true, silly as they seem. For me, maybe it's ESP; for you something else.) He admits a qualm or two himself about some of them. But in these cases he points out that however sound the core of "science" may be, a typical circle of quacks and sheep has sprung up around it.

David Starr Jordan, first president of Stanford University, coined the term "sciosophy"—"shadow wisdom"—for what he called "systematized ignorance." (His book was "The Higher Foolishness." "Foibles and Fallacies of Science," by Daniel W. Hering and "The Story of Human Error," by Joseph Jastrow are others mentioned by Mr. Gardner.) And there are measuring rods by which the layman can judge any new proposal advanced in the name of science.

First, science and pseudoscience must meet the same strict standards of evidence and coherence. "A fairly complete textbook of physics would be only part of the answer to Velikovsky," wrote Professor Laurence J. Lafleur in *Scientific Monthly* (November 1951): in fact, a five-foot shelf of books would be needed to evaluate and refute all of Velikovsky's cited "facts." But whereas he discards conventional mechanics, astrophysics and electrodynamics, Velikovsky has nowhere supplied a coherent hypothesis which will fit the whole body of known phenomena as well as the few alleged events with which he has concerned himself.

Second, there is the small matter of competence. As the body of known scientific facts grows, it becomes more and more impossible to comprehend all, even, of one field. For the amateur and nonspecialist it is doubly difficult, for he does not know the literature and does not have access to it. And a man who does have a specialist's training and knowledge in one scientific field may have no qualifications whatever to pass judgment in another.

Some examples: one afternoon in the late '30's, looking out of my office

window, I saw what appeared to be a green daylight meteor over the Mohawk Valley. So what: so I'd seen a green meteor—but a few months ago Astronomer A announced via the press services that there are no green meteors, and that some seen in the southwest must have been "flying saucers." As a layman I was now overruled by an Authority—until Astronomer B snorts and says of course there are green meteors. I am now back at the simplest—and original—explanation.

Or the alleged Phoenician inscriptions which are supposed to have been found in a pasture in eastern Pennsylvania. I haven't seen them: if I had, I certainly couldn't state of my own knowledge that they are or are not the names of cities and rulers, written in ancient Phoenician. A man who claims to be an expert says that's what they are. He cites confirming evidence ("cities" and inscriptions in Brazil—which aren't mentioned in anthropological references such as the new "Handbook of South American Indians"). I have an idea that it might not be hard to locate an Expert B, who makes a living out of translating ancient inscriptions, and who will say they are nothing of the sort. I have no deep-rooted prejudices against Phoenicians in America, but as a layman I can't check the evidence for myself—and I have reason to question the layman-"expert" more closely than the specialist-"expert."

But let's get back to the characteristics of the typical crank, as Martin Gardner sees him. Usually he works in total isolation from colleagues in the field. This, Mr. Gardner points out, is a medieval tradition carried down into the present. When religious conservatism presented a wall against independent thinking and inquiry, science had to work in isolation. (But, says today's crank, orthodox scientific conservatism now presents a wall against *my* independent thinking about *true* science.)

This isolated, unappreciated genius writes, if he writes at all, for journals outside of the field he is treating—for newspapers, popular magazines, cult journals, but never for the established scientific journals. (They won't have him.)

There are certain personality traits which seem to characterize most pseudoscientists. They consider themselves geniuses. (Of course: they have seen clearly where centuries of blind dolts have been confused.) They regard their colleagues as ignorant blockheads. (The fools won't abandon their orthodoxy and accept the new gospel.) They consider themselves the victims of persecution. (Haven't the recognized journals and societies conspired to freeze out any word of the truth?) They have strong compulsions to attack the best-established theories and greatest scientists. (Why be a piker?) They tend to write and talk in a specially invented jargon which applies

only to their own form of "science."

Such pseudoscientists may be of low intelligence—revolting against the snobbery of the "educated"—or they may be brilliant scholars. Are there circumstances under which men and women of low and high I.Q. alike may have these attitudes?

There are, says Mr. Gardner: in paranoia.

You will find the illustrations of crackpot science in "In the Name of Science" fascinating, if perhaps too briefly discussed in some cases. The author opens with a chapter on the flat Earth and hollow Earth cults, some of which Willy Ley has discussed in these pages. Koreshanity, which holds that we inhabit the *inside* of a hollow sphere, was still flourishing in 1949.

Velikovsky and other "monsters of doom" come next: Ignatius Donnelly's "Ragnarok" to explain away the glacial period; Hörbiger and his followers. Charles Fort gets the chapter he merits. Though the author tends to consider him a hoaxer rather than a crackpot, his writings have nourished many a wild theorist.

Flying saucers; the Orson Welles "War of the Worlds" broadcast; Lawsonomy with its "Zig-Zag-and-Swirl" to replace gravitation; the anti-relativity lot, including George Francis Gillette and his theory of "bumping" ("gravitation and backscrewing are synonymous. All mass units are solar systems . . . of interscrewed subunits"); Roger Babson's search for a gravity screen (Edison thought there should be one); dowsing and doodlebugging; generation of life from the inanimate—so the roll goes on. In the chapter "Geology versus Genesis" the story is of science against fundamentalism; in the following chapter it is the story of Lysenkoism, the Soviet "revelation" of evolution. There is the story of the pseudoscientific racists, of the lost-continent cults and their absorption by occultism—otherwise by-passed in the book in favor of the saner varieties of scientific insanity. There are the pyramidists.

As the author swings relentlessly on, he begins to tread on some tender toes. Readers who will laugh at Voliva and Velikovsky will swear by osteopathy, homeopathy or naturopathy. Then, too, some Astounding subscribers undoubtedly eat yogurt and the rest of the Hauser diet, practice eye exercises by the Bates system, are interested in Korzybski's general semantics, and relax again in the final chapters on phrenology, graphology, ESP and PK. (On the last page you'll find the paragraphs from Fort which Richard Matheson deftly expanded into his "Witch War" in the Bleiler-Dikty, "Best Science Fiction Stories: 1952.")

"In the Name of Science" should be a fascinating book for any science-fiction reader or writer. What is re-

vealed behind it is the tendency towards blind belief which seems to be characteristic of the human species. Perhaps—though the idea is not developed—there is a sort of social paranoia which affects us in such things, and obscures our ability to judge a new hypothesis by the same standards which we have raised for the old.

For the Phoenicians-in-Pennsylvania theorist does have this in his behalf: I doubt that any of the country's experts on Semitic writing has "bothered" to look at the alleged inscriptions and decide whether, on the basis of his own knowledge and experience, they are natural markings in the stone, forgeries, or authentic. No physicist could take the time to write the book —and spend the years of research— necessary to check and refute Velikovsky.

And maybe Mr. Gardner is right, statistically, when he suggests that one of Professor Rhine's long runs of correct card-guesses should be judged for probability not against the other guesses in the series, but against all guesses made by anyone, anywhere, and at any time!

Science fiction extrapolated orthodox physics and astronomy and saw rockets to the Moon, atomic energy, radar, television. At the time, many orthodox physicists treated these extrapolations as pseudoscience—"crank" science.

There are other assumptions embedded in today's science fiction which may or may not prove to be "true": ESP, thinking machines, immortality, violent, and large-scale mutation, faster-than-light travel, antigravity.

It seems to me that it is important that science fiction remain fiction—and this is what Kendell Crossen is saying in his editorial in *Startling*. We can pride ourselves on our scientific knowledge and thinking. We can assure our readers that we know very well which is projection and which is pure fancy. But if we lose that ability to judge and, emboldened by the coming-to-pass of rockets and atomics—in very different form and with different results from those predicted in the usual pre-atomic story—we become confused about the reality of some of the fictitious science invented for our stories, then we are in danger of going over to the cranks, and science fiction of losing all it has gained.

Atlantis, probably, was invented as a story—like Trantor or Florina or Barsoom. Somewhere it crossed the line from science fiction to fictitious science—to pseudoscience—to a cult —and eventually to a tenet of the most fantastic kind of occultism.

We have seen Shaverism take this course even more rapidly and violently. Flying saucers, too.

Let's accept August Derleth's dogma that science fiction, since it is fiction, is a form of fantasy. If we know that, if we understand it and refuse to be confused over it, there's not much

danger that we will be carried away by the fancy into the paranoid, authoritarian state of mind of the cranks —for remember, *krank* in German means "sick." And science fiction must above all be healthy literature.

DOUBLE JEOPARDY, by Fletcher Pratt. Doubleday & Company, Inc., Garden City. 1952. 214 pp. $2.75

The most skillful blending of science fiction and detection, outside of one or two of Anthony Boucher's "Fergus Breen" tales, has been achieved by Fletcher Pratt in the two related yarns which are dovetailed in "Double Jeopardy."

The wheels-within-wheels-within-wheels van Vogtian plot relies on a large element of mystery for its effect, but makes little or no pretense of giving the reader a fair break in solving the puzzle. The spy or chase type of tale has also been pretty successfully blended with a science-fictive theme in such books as Cyril Kornbluth's "Takeoff," James Blish's "Jack of Eagles," or Jerry Sohl's "The Haploids." But it has taken Fletcher Pratt to project a believable plot on a believable situation, just a little way ahead, and produce a two-story tale in which events and science are intimately interwoven.

The hero of the book is Secret Service Agent George Helmfleet Jones, assigned—on the convenient excuse of a seemingly counterfeited half dollar—to help the Federal Bureau of Medicine run down the source of a dangerous inhibition-releasing drug, perizone. It seems to be coming from a small foundation in upstate New York, where an old school chum of Jones' is working. And in Geneva, at the Braunholzer Research Institute, he finds not only his friend but the beautiful but cold-headed Betty-Marie Taliaferro, a blonde to surpass all blondes who is *not*—very significantly —the heroine of the tale. Mystery compounds mystery, and no sooner is the matter of the perizone the phony four-bits and the kidnaped bronze satisfactorily settled, than the F.B.I.'s integrator insists that the seemingly unrelated disappearance of a three million dollar gold cargo from the transcontinental drone rocket should be related to the Geneva caper.

The integrator, of course, is perfectly correct, and so Jones is launched on his second round of jeopardy in the matter of the excessive fingerprints, the triplicate alibis, and the banker's daughter. All the necessary clues are honorably and subtly planted where they will do you the least good —unless you let yourself be carried along by the world of the next generation but one, in which case you may find yourself giving Jones a run for his ratings.

It's all great fun if you like both mysteries and science fiction, but there's one fluke right on page 15: that reversed half-dollar would have been completely a mirror-image, let-

ters, numerals and all, in view of the way it was made.

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28 SCIENCE FICTION STORIES OF H. G. WELLS. Dover Publications, New York. 1952. 915 pp. $3.95

Rumor to the contrary, this book is not a new edition of the "Short Stories" which appeared a number of years ago, as Dover's "Seven Science Fiction Novels of H. G. Wells" is a reprint of the earlier collection. The new book gives the reader in some ways more and in others less than the "Short Stories": in any case, nine hundred pages of hard-to-find Wells is a bargain.

The "Short Stories" brought together the sixty-three stories in the various Wells books. The longest was "The Time Machine," which had also appeared in the "Seven Famous Novels." Instead of reprinting, Dover has selected twenty-six of the best of these—such tales as "The Empire of Ants," "The Country of the Blind," "Aepyornis Island," "In the Abyss," "The Sea Raiders," "The Crystal Eggs," "The Man Who Could Work Miracles," or "The New Accelerator," in which Wells pioneered on now-standard themes—and added two short utopian novels, "Men Like Gods" and "Star Begotten."

These were among Wells' later novels and have not quite the magic of his earlier and less self-conscious romances. By this time the author was taking himself very seriously as a social critic and prognosticator, and letting ideas get in the way of readability. Marie Louise Berneri, in her "Journey Through Utopia," goes into considerable detail in discussing the utopian society depicted in the book, and calls the book the last utopia in the classical tradition. Negley and Patrick, in their "Quest for Utopia," say of Wells' "A Modern Utopia" as they might have said of "Men Like Gods": "while it is definitely in the classical tradition of speculative utopias, the vision of the idea is always slightly distorted by the inescapable perspective of the real." Incidentally, in sending his assortment of modern (1923) Britons to Utopia, Wells used the now well-worked device of parallel worlds.

"Star Begotten," as the title suggests, deals with the idea that extra-terrestrial sources—Martian, to be specific—are somehow tampering with human genes and chromosomes. Joseph Davis, his writer hero, originates the idea—in which Wells pokes fun at his own Martians of "War of the Worlds"—and sets out to search for confirming evidence. But what Wells does with the theme is very different from what a present-day magazine writer would feel himself required to do.

Since all these stories in their earlier forms are out of print and very nearly impossible to find in libraries or secondhand book shops, this is obviously required reading for anyone who takes

science fiction seriously.

FOUNDATION AND EMPIRE, by Isaac Asimov. Gnome Press, New York. 1952. 247 pp: $2.75

Of the two major constructions of the future which have been developed principally in these pages, the most subtle and carefully designed is Robert Heinlein's but the most sweeping is Isaac Asimov's.

Heinlein is concerned with people as they live under the circumstances and in the cultural atmospheres of various stages in his "Future History." Asimov, on the other hand, has centered his interest on the structure of his future, through the mechanism of Hari Seldon's psychohistory. And therein lies the flaw in his stories of the Foundation: the bones show.

As an intellectual exercise—a sort of puzzle—the working out of the Seldon crises makes a fascinating series: the first crisis, solved when the Foundation establishes its underground as a religion in the outer worlds of the crumbling Galactic Empire (whose formative years he is now describing in "The Currents of Space"); the second, when the Traders moved in where religion had failed. These steps in Seldon's projected thousand-year rebuilding of a Galactic culture were described in "Foundation" (Gnome, $2.75).

Salvor Hardin and Hober Mallow, the personalities around whom these first two crises centered, did emerge with some degree of stature as persons. Not so Bel Riose, the Empire's general who discovers and surrounds the Foundation in the first third of this book—and who is defeated by forces within the dying Empire which Seldon's psychohistory had foreseen.

At the same time the First Foundation is itself losing the force and direction on which Seldon had counted. And when a fourth crisis arises—the mysterious, seemingly omnipotent warlord who calls himself the Mule—it is not the danger which Seldon had foreseen and which the Foundation, following his laws of mass human reaction, would overcome.

The "secret" of the Mule is telegraphed to the reader who follows Toran of Haven, son of the Independent Traders whom Seldon had expected to revolt against the Foundation, and his Foundation bride, Bayta. But it is Ebling Mis, the old psychologist, who shares the book's jacket with Bel Riose and Ebling Mis who in the end discovers the nature of the Second Foundation which may yet vindicate Hari Seldon's design for humanity. The search for the Second Foundation "at the other end of the Universe"—and its discovery—will presumably provide a third book in Gnome's series.

These Foundation stories are well worth having between hard covers. They represent a great sweep of the imagination, and they may well come as close to the social forces controlling

and directing human culture as do Toynbee's or Spengler's cycles of rise and fall. The force which protects the Foundation against Bel Riose is one which we hope may save the Free World from Soviet communism. But it is the structure, not the people of the Foundation or any of its worlds, that matters. The Asimov humor, too, is sadly missing. These are books for the devotee—not for the convert or the to-be-converted.

THE STARMEN, by Leigh Brackett. Gnome Press, New York. 1952. 213 pp. $2.75

Leigh Brackett's first science-fiction novel to see book publication answers in its own way the unanswerable question which underlies the eventual conquest of space: "Why bother?"

There are military reasons for a space station and an outpost on the Moon, and probably for an onslaught on the stars; there are even better scientific reasons. But in the long run the reason men will go into space is the reason of Kipling's poem, the reason Mallory died on Everest: because it's there.

In an opening which has a touch of the old Merritt, we meet the restless changeling Michael Trehearne, following the mystery of his lineage to the Midsummer Fires of Brittany. There he finds his heritage and his blood in the Starmen of Llyrdis—the Vardda—mutant traders and rovers of all space. There he wins the hatred of the powerful Sherrel, the friendship of enigmatic Edri, and arouses the interest—and more—of the beautiful Shairn.

The plot of "The Starmen" follows Trehearne to Llyrdis and beyond—as he proves his Vardda heritage in an ordeal by spaceflight—as he defies Sherrel and rejects Shairn's patronage to rove the worlds of the galaxy—as he fights against treachery, then meets it face to face in the jungles of the Hercules cluster—as at last he throws in his lot with the orthists, who dream of the day when the Varddan power to compass space will be granted to the folk of every intelligent race of the galaxy.

There is nothing pretentious about theme, plot, characters or writing: just a good story, very well told. But Leigh Brackett does make the point which is one of the basic tenets of science fiction, and we hope of reality, that Man—and every other race—will reach out for space simply because it's there, and that this hunger will not forever be denied.

STAR MAN'S SON, by Andre Norton. Harcourt, Brace and Company, New York. 1952. 248 pp. Ill. $2.75.

Junior science-fiction of the better kind is dividing itself neatly into two sorts. There are books written for young people by practiced science-fiction authors like Robert A. Heinlein or the men responsible for the best of the excellent Winston series. There are

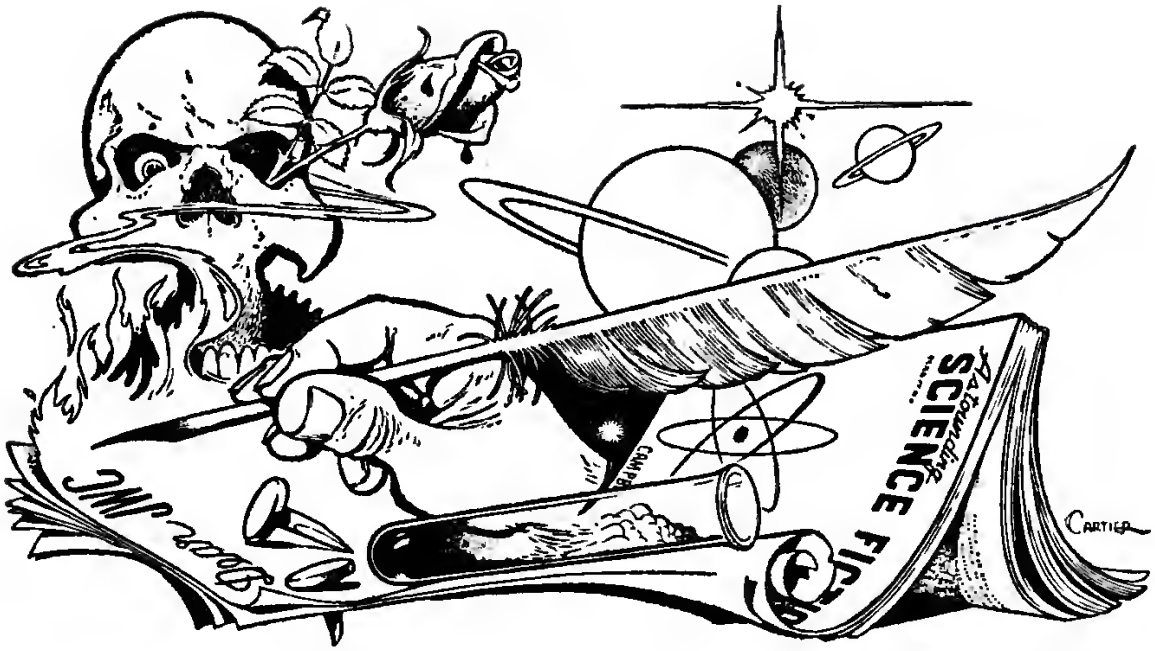
also books written by experienced teen-age authors, experimenting with the newly popular medium. The best of these to date is Andre Norton's "Star Man's Son: 2250 A.D."

ASF readers will remember that Mr. Norton, who has a number of well received adventure books to his credit, succeeded in transforming the "Bullard" tales into acceptable juvenile fare with the lightest and deftest of touches. I could not tell you now, without a line-by-line comparison, what was omitted from the original stories and what, if anything, added. But "Star Man's Son" is all new, all original, and all excellent.

If Fors, mutant hero of the book, were a few years older there is nothing in this story—and nothing lacking from it—which would not make it an acceptable serial in most current science-fiction magazines. Here is a picture of a world two centuries after a devastating atomic war, three centuries after our own time. In North America, little colonies of survivors have developed their own cultures and their own physical differences, just as did the first wandering bands of *Homo sapiens* a few hundred thousand years ago. Fors' people, the Puma Clan, are mountain-dwellers whose Star Men are dedicated to the recovery of the lost knowledge of the past. They have as hunting companions great mutant Siamese cats, panther-sized, one of whom, Lura, has chosen Fors as her associate. But because he is physically different from their norm, Fors is not allowed to follow in his father's footsteps as a Star Man. Rebellious, he sets out on his own, with Lura, to find the ruined cities his father saw.

Every detail of this strange world is sketched with reality. The Plains People—the dark-skinned southerners, one of whose scouts Fors rescues and makes his friend—and the strange creations of atomic aftermath, the lizard folk and the Beast Things—these come alive in Mr. Norton's words and Nicolas Mordvinoff's illustrations. Whether the Beast Things are warped humanity or furiously evolving animals like the lizards is something the reader must decide for himself.

How confused the uninitiated reviewer is likely to be is shown by the New York *Times* notice, which declared that the book "is not science fiction in the strict sense—no spacesuits or other alluring gadgets." More books like "Star Man's Son" may gradually persuade even teachers and librarians that there is more to science fiction than the "alluring gadgets" of television and the comics. Let's hope that Andre Norton moves in there next to Heinlein and stays.



BRASS TACKS

Dear Mr. Campbell:

If, as Mr. Elliott half suggested in the May issue, your editorials are meant to be provocative, I have a hunch that the recent one on Aristotelian thinking is going to hit the jackpot. It should certainly provoke a lot of response from the proponents of non-Aristotelian modes of thinking. Just to help that prediction along, let me offer my own comments.

First, a definition: by "Aristotelian" I would intend reasoning which (a) employs *only* those statements to which all of Aristotle's famous "laws of thought" may be applied, and which (b) draws conclusions from such statements in accordance with the principles of the syllogism. The parallel here with non-Euclidean geometries is both intentional and illuminating. Just as a geometry is described as non-Euclidean if even one of the postulates of Euclid is intentionally dropped or modified, so a logic—and the reasoning based on it—is non-Aristotelian if one of Aristotle's postulates is changed. (I would stress the word intentional—an accidental change should probably be called an error in logic. Incidentally, if the human mind can think only in Aristotelian fashion, such logical errors are a little hard to understand).

To go now to the physical universe: again, just as the space-time conti-

nuum is considered non-Euclidean because it appears at present impossible to carry out Euclidean constructions everywhere, so the universe may be called non-A if we find that we cannot make statements about physical processes which both agree with experimental fact and conform to A laws. This does not mean that E and A postulates are therefore "always" wrong; just that they are not everywhere applicable.

Since your editorial stressed what you called "yes-no" factors, let us consider the application of Aristotle's Law of the Excluded Middle. Briefly, this holds that "Every statement is either true or false." If then the world is Aristotelian, if the L.E.M. is everywhere valid, then the following statements must be either true or false:

(1) "There is an electron at point P."

(2) "This electron has a velocity V, an acceleration dV$dt, et cetera."

Also, if true, these statements lead —in an A world—to a definite prediction of the position and velocity of the electron at some future time. However, our best observational data, our most powerful theories all combine to assert that such statements about electrons can be neither true nor false, but only more or less probable. And this—to my mind at least—justifies the assertion that the world of atomic and nuclear processes is essentially non-A.

Turning now to neurology, is the human brain capable of anything but Aristotelian thinking? The first thing that requires emphasis here is that present knowledge of the neuroanatomy and neurophysiology of the human brain is still very fragmentary. We know something—though far from all—about how, when light falls on the retina, a nervous impulse is carried up through halamus to visual cortex. We also know a little bit about where an impulse starts in the motor cortex, and how it leads down pyramidal tracts and spinal cord to produce a simple movement of the arm. But what goes on in between visual and motor cortex, what happens in the nervous system when I feel thirsty, see a glass of beer and reach out to drink it—all this is still pretty much anyone's guess. It is "true" in a limited sense that a single neuron either fires or doesn't; and that neurons would make excellent relays. But it emphatically doesn't follow that the brain "is" a digital computer. That particular notion, no matter how attractive or how distinguished its proponents, is still a speculation and should be clearly recognized as such.

Then, too, there is more to the brain than neurons operating according to the "all-or-none" law. There are "non-synaptic" processes—perhaps mediated by the electric fields which surround every active neuron—by which one neuron can influence others apart from the relaylike action at the

synapse. There is the process called "spreading depression." This process, of as yet unknown nature, can travel into and out of areas of the cortex even when all neuronal connections to those areas have been severed. Sloan and Jasper conclude an experimental report on this process with these words: "concepts employing neuroanatomical connections and circuits must be combined with concepts based upon processes which can act independently of such connections."

In short, present knowledge of brain function is too vague to permit us to say that the brain must "think" like a relay computer. The existence of "field processes"—such as have been outlined—makes equally plausible the model of an analogue machine. Indeed, it is not unthinkable that the brain could act in both ways: using the relay-action of chained neurons—digital computation—where precision is needed, and the interactions of electric fields, et cetera—analogue computation—when breadth and generality are called for.

Maybe some such combination is the way to build "creativeness," "imagination," et cetera into the machine?
—A. Arthur Smith, 5204 Montclair Avenue, Montreal, Canada.

You're perfectly correct; the purpose of the editorial was to stir up some comment and thinking. The basic philosophy of the scientific method is the method of The Alternative Hypo-

thesis; we must consider both possibilities. I feel a logic system that is based on the concepts similar-dissimilar, rather than true-false, would be a sound, workable, binary system. No possible concept can "be" an electron; however, a properly formulated concept can "act like" an electron. The basic problem of living is predicting what will happen; the brain seeks to solve that problem. If a concept can be constructed that "acts like" an electron, then manipulation of that concept will predict the behavior of the electron.

The first problem then is to construct a concept that does "act like" the subject under consideration. To do this, observed data on the subject must be checked on a one-to-one basis with the concept; the important data then is similar-dissimilar.

Note that the galvanometer is the physicists' basic instrument; he uses it solely to determine that Apparatus System A is not-dissimilar with respect to Natural System B, in some electrical parameter. By multiple determinations of similar-dissimilar constructs, the physicist derives a concept construct which "acts like" Natural System B in many parameters. Ideally it will "act like" the natural system in all respects, except that the concept construct will be mentally manipulable.

He can then thrust two concept-constructs of U-235 together, watch the concept-constructs interact, study it in intimate detail, for many hours, and live quite unharmed.

Yet the concept-constructs need be made up only on similar-dissimilar determinations of an adequate number of parameters. The flaw in much Aristotelian thinking is to fail to consider enough parameters in establishing the concept-canstruct. Any tool, even the finest, can yield wrong answers if incorrectly used!

Dear Editor:

Have read for years stories and articles on space travel that make the false assumption that a person on the Moon or other panet of lighter-than-Earth gravity would be able to leap over obstacles of height greater than those he could clear on Earth, the height being figured as inversely proportional to the decrease in gravity. These gentlemen who write such "data" say a man can jump over a five-foot obstacle on Earth; on the Moon, gravity is only one sixth as strong; therefore he can jump six times as high or clear a thirty-foot obstacle—! Sounds logical, but overlooks some of the important facts about how people jump—and confuses clearing an an obstacle with lifting the human C. G. A six-foot man, standing, has his C. G. roughly three and one half feet from the ground, in leaping over a five-foot barrier, his C.G. will clear it by a foot or less, therefore be lifted two and one half feet, the other two

and one half feet for clearing the obstacle being obtained by *tucking up the legs*. If *I* haven't overlooked some other factors, then a man on the Moon should be able to leap over a seventeen- to eighteen-foot obstacle, hoisting his C.G. 6 x 2½, or 15 ft. pulling in his legs for the rest. Still a pretty good jump, but a long way short of thirty feet. There should be another way to calculate this—let's see—a man on the Moon would weigh one sixth of say, one eighty, or thirty pounds. His *inertia* is the same—we think. Now if we knew how fast a man's leg muscles could push an object weighing thirty pounds with an inertia of one hundred eighty pounds, we could calculate how long that six foot per sec (Approx) gravity of the Moon would take to stop and retrieve it, and how far it would travel before it stopped. Anyone care to take it from there?—James W. Wilber, Route 2, Box 36-A, McLouth, Kansas.

And how fast could a man run in an air-drome arena on the Moon?

Dear Mr. Campbell:

We have watched with interest and some amusement the controversy aroused by L. Sprague de Camp's article on "mad scientists" and are in complete agreement with the obviously true criticisms concerning the failure of psychology and sociology to reduce the cultural lag. However, we

resent the vicious and misleading attack against psychologists, *per se*, by Clifton in the September 1952 issue of ASF. We feel it necessary to offer a rebuttal.

We admit the truth of knowledge without wisdom, but wisdom without knowledge is an impossibility, since wisdom is the most suitable application of knowledge in any situation. As to this "law" of the inverse relationship of knowledge and the capacity for wisdom—

Regarding Clifton's "review" of the history of the IQ measurement "game," we refer him to Mr. de Camp's reply to Mr. Hubler's letter—ASF, February 1952—with special reference to the infinite wisdom of the statement, "To argue with an emotion is notoriously futile." We extend the hypothesis that this ridiculous and sarcastic attack on psychologists such as Binét, Galton, and Ebbinghaus, who—in case he does not know—were the founders of mental testing, is obviously based on emotion rather than knowledge *or* wisdom. We refer Clifton to Gulliksen, H., "Theory of Mental Tests," New York: Wiley, 1950; and Wexler, D., "The Measurement of Adult Intelligence," Baltimore: Williams and Wilkins, 1944; and the further references he will find in these books.

His statement that there will be few who are smart and many who are stupid is in complete disregard of the normal curve of distribution of intelligence no matter how measured.

The type of IQ test of which Clifton is speaking is fully recognised by the modern psychologist as being a measure of verbal ability, applicable only to our and allied cultures. If he cares to term abilities and aptitudes other than this "intelligence" in our culture, then he must take account of measures of these aptitudes which psychologists possess. We refer to the hundreds of mechanical, artistic, clerical, and so on, tests which are available to, and used in industry, the military services, and placement bureaus throughout the world. This, of course, immediately refutes Clifton's statement that psychologists "could not admit [measures other than IQ tests]—and would have been unable to measure them anyway since he did not participate in them."

As for Clifton's statement, "Now you take *my* brand of intelligence, for instance"—we would rather not.—Edward S. Fleming, Kenneth W. Haun, 2802 Whitis Avenue, Austin, Texas.

I am afraid I'm guilty of unfairness. Fleming and Haun were not alone, by any means, in berating Mark Clifton as being a crank having no knowledge of the matter he discussed. Sorry, I should have warned you; Mark Clifton is a widely known, highly respected industrial personnel psychologist, with many years of experience in application of testing procedures to actual problems of selecting

individuals competent to deal with real world problems. Clifton, gentlemen, knows all the theories—and speaks from many years of experience.

Dear Mr. Campbell:

Congratulations on your recent Brookhaven coverage! No doubt most of the ASF readers by now are aware that the cosmotron successfully has attained over two begavolts during trial runs.

It might be of interest that I mention an accelerator project, hardly in the blueprint stage yet, but which should when completed well exceed any other existing installation: an inter-European nuclear physics center sponsored by eleven nations and to be located near Geneva, Switzerland.

Originally the project grew out of an American proposal which then took shape through U.N.E.S.C.O. The matter is now being handled by a joint European council, including such names as Bohr, Heisenberg and Amaldi. The core of the project will be two accelerators; a 600 Mev synchocyclotron and a 10 Bev proton synchotron!

The 600 Mev output figure for the former instrument was decided upon partly by advice of the Chicago group. They claim experimental evidence for their present 450 Mev accelerator turned out to be somewhat too small! The cosmotron project will be headed by Odd Dahl of Norway, but like everything else is still only in the late speculative stage. Following the Berkley scheme the protons will be preaccelerated by a large Alvarez-type linear R.F. accelerator before entering the cosmotron. Besides the obvious engineering obstacles to be overcome many new problems appear due to the immensity of the instrument. Perhaps the most important is that of predicting particle behavior. In order to obtain the desired energy the particle

orbit must be very great; much greater indeed than that of the Brookhaven instrument. Due to this particle behavior will tend to deviate from normal behavior due to curvature, and the result will be a complex mixture of some phenomena due to curvature and some due to linearity; making behavior predicting very difficult. Also, one must decide if one should build a very large primary linear injector, making the cosmotron requirements less exacting, or vice versa.

The most practical type of vacuum chamber seems to provide one of the major problems. In this case economy and practical feasibility must strongly modify the requirements of the physicist. (This was a source of quite a bit of trouble at Brookhaven, by the way. They spent some very sad moments sweeping up porcelain pieces). Air cooling has been suggested instead of water for the coils, et cetera, et cetera.

No doubt the center will provide a wealth of new information regarding nuclear structure and forces, primarily in meson physics. But the main reason for launching the project is to show that it is possible for a group of "minor" nations to co-operate in a very exacting task, and that European labs can, when they want, stack up to similar American installations!—Per F. Dahl, Cpl., RA 17272282.

The co-operation of forty-eight small American states has also proved very effective in science as well as other fields. More power to the co-operators in Europe!

Dear Mr. Campbell:

Along with my subscription renewal I decided I might as well write a letter to "Ye Editor" and unload a few ideas that have been knocking around in my head for some time. The first of these was induced by J. J. Coupling's article, "Don't Write: Telegraph" some time ago. At the very end of the article Mr. "Coupling" gives brief mention of the effect of a shift in frequency due to the Doppler Effect. Now it seems to me that this effect would, in fact, cause a great deal of headache to any communications engineer attempting to design equipment for planet-to-planet, or planet to spaceship, et cetera, communications.

The simple law of the Doppler effect is $F_{rec} = F_o (1 + V/c)$ where

F_{rec} is the received frequency
F_o is the transmitted frequency
c is the speed of light
V is the relative speed of approach or recession

From the formula, it can be seen that as the relative speed of the transmitter and receiver approached the speed of light, the transmitted frequency would appear to double at the receiving point, assuming receiver and transmitter to be drawing towards each other. But, if I am correct in interpreting the effect, as the receiver and transmitter recede or draw apart,

the transmitted frequency would appear lower at the receiving point. Would not this mean that at the speed of light the received frequency would be equal to $F_o (1-V/c)$ or F_o times zero, which is zero? In other words, the transmitted wave never reaches the receiving point at all. So perhaps the idea of the Mars ships and Mars expeditions being out of touch with Earth are not "heresy" after all.

Imagine the terrifically wide band receivers that would be needed for all types of point-to-point communications; point-to-point being planet-to-planet, planet-to-asteroid, ship-to-planet and so forth.

Each time a radio wave was received from a ship or planet, its frequency would vary enormously according to its speed, relative position, and angle of approach or recession. If we assume that our spaceship builders have indeed realized the speed of light, about the only way to attempt to communicate with it—using radio as we know it—would be to have the astrogator plot a course which would put it in a direction tangent to the planet and its orbit, which at great distances would probably result in very small Doppler effects as long as such a course was maintained.

I might add that already the slipstick boys are worrying about the effect of high speeds in aircraft navigation systems. At a transmission frequency of 10,000 megacycles and a speed of about 500 miles per hour, the shift in received frequency amounts to around plus or minus 6 kilocycles; at 100 megacycles the shift at the same speed amounts to about 60 cycles. These are present-day problems!

The other idea? Well, ever since the art of recording and reproducing sound was attempted, the method used, and those still in use, have a basic flaw in that some sort of mechanical motion must be used. In the

present-day systems, all use mechanical motion; a moving tape, a revolving record, a moving wire, or a moving film, all with subsequent loss in fidelity and introduction of noise due to the mechanical means which must be used to move the material past the pickup device. Now, why not move the pickup device instead of the recorded material, and use the most effective method of motion, which has no friction to speak of, and which can move at most any speed desired, namely, the electron beam? To record a piece of music, say, use a device similar to a television picture tube, which instead of receiving a picture signal on its grid, would instead receive the output of the microphone and its amplifiers. The electron beam instead of scanning a phosphorescent screen would scan a sensitive film which when developed would be the master print for all subsequent reproductions. The pickup device, or player, would necessarily have to be something like an image orthicon, which would scan the previously made print, and picking up the varying shades of light and dark, would convert them back into the original sound. Just think, an all-electronic system! It seems to me that this would be as far superior to the present-day methods as the all-electronic television is to the "not so far back" mechanical scanning methods. Wonder how many reasons there are that it cannot be done?

The magazine is getting to look better and better. How about some covers by Cartier? The articles are stimulating and very welcome, would like to see some more on computers and related mechanisms.

Incidentally, I am no relation to the author of the same name!—Ralph C. Williams, Winston-Salem, North Carolina.

Did you ever see a TV set that produced a perfectly undistorted image? Mechanical devices have the advantage of a great degree of reproducibility; your suggested photographic film itself is a mechanical device, and, since films have grain, will itself yield noise.

Dear Mr. Campbell:

Your editorial on creative thought which you titled "Speculation" was highly stimulating—an example of what such speculative thought produces. But the article itself was not speculation, but its end-result, a developed idea.

So we still have not had a published article containing such speculative thought—and I don't think we ever will. The reason is obvious. There would be too much dead wood and, well—speculation!

As an example, consider one of the principal subjects for speculation, which often appears in ASF stories: time travel. Speculation on time travel

might go something like this. "I wish I knew what is going to happen next year. I wish I could go there, like going to the corner grocery. Could such a thing be possible? What do I know, and what have I ever experienced, which would indicate that time travel could be possible? Let's see— " And then would ensue a series of associated ideas, all connected in some way with time, and a process of selecting probable lines for investigation, and rejecting absurdities. After that there would be a period of research, of checking other sources for pertinent information. In all of this the mass of material considered and rejected would exceed acceptable material as a shower exceeds a raindrop. If it were possible to capture all of this thinking process, much of which is intuitive, it is very unlikely that anyone would be interested in reading it.

But just because speculation cannot be published is no reason to underestimate its value. I agree with you that such thought alone is responsible for all human advancement.

With this in mind, I humbly submit this highly speculative idea. I wish I had a Speculating Machine, which I could set on my desk like any other office machine. Any subject for speculation could be submitted to it on a card or tape, and it would immediately check an electronic information bank for pertinent ideas, rejecting all improbabilities. All I would have to do is supply the motive and act as evaluator. By resubmitting the ideas I considered important, I could let the machine pull out the data on each one, thus running the line of speculation to a conclusion.

But this is speculation, of course.— Edgar R. Schott, Benton, Missouri.

I have wished for something like that— as all authors do! And, of course as all scientists do!

(*Continued from page 6*)

centages are an abstraction; they are generalizations and integrations of real-life phenomena—the action level (real-life phenomena) is invariably Aristotelian. A photographic film *appears* to produce smooth gradations of tone; ask any photographer whether that is the case. Eastman has spent millions on research seeking to make that fond hope true—and hasn't yet eliminated it at the microscopic level. Astronomers recognize it, perforce; a star, sharply focused on a sensitive plate, must deliver enough light-energy to trigger the photo-chemical reaction. If it doesn't trigger the action, nothing whatever happens. If it does—one silver iodide grain in the gelatin emulsion changes from non-developable to a developable system.

I've seen a system of television transmission demonstrated in which a step-modulation system was used. Part of the demonstration was a simplification to illustrate the principle: the scene was scanned, and every minute area that was more than fifty per cent white triggered a "white" signal, while every area under fifty per cent white triggered the "black" signal. In the actual developed system, seven steps were used, and the effect was an excellent picture. But in the fifty per cent two-step system, we had a perfect Aristotelian system. The mechanism insisted that everything in the world was either pure white or pure black.

Naturally, the picture left considerable room for improvement. But it's interesting to recognize this: since we are forced, by the nature of things, to either act, or not-act, the Aristotelian Universe we communicate through is necessarily making exact and delicate shadings of intent extremely difficult to convey.

It's easy to get a communication from a very simple system correctly; a stone, released from the hand, invariably falls. Its "motivation" is as simple as its response; it's fully understandable.

A more complex system, however, necessarily involves something more. A human being is far and away the most complex system in the known universe.

The discussion I've just given indicates that a human being can communicate only on an Aristotelian basis; he does or does not do A; he does or does not say B. The nature of the Universe forces us to be Aristotelian in action.

Internally, however, the human being does *not* "act" in that way; his thoughts are not all-black or all-white.

Problem: What is the solution to the fact that one human being can communicate grays and shadings and tones to another, although his every act must necessarily be on a yes-or-no basis? For the self-evident fact is that we do communicate tones!

THE EDITOR.

He Asked Permission to Stay

Major William E. Barber, USMC
Medal of Honor

EIGHT THOUSAND marines lay besieged at Yudam-ni; three thousand more were at Hagaru-ri, preparing a breakthrough. Guarding a frozen mountain pass between them, Major Barber, with only a company, held their fate in his hands. Encirclement threatened him. But he asked permission to stay, and for five days the company held the pass against attack. When relief came, only eighty-four men could walk away. But Major Barber's action had saved a division.

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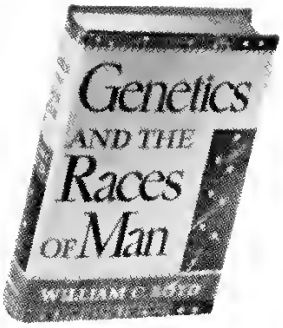

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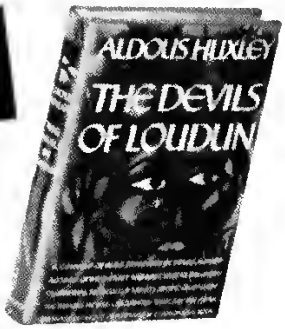

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